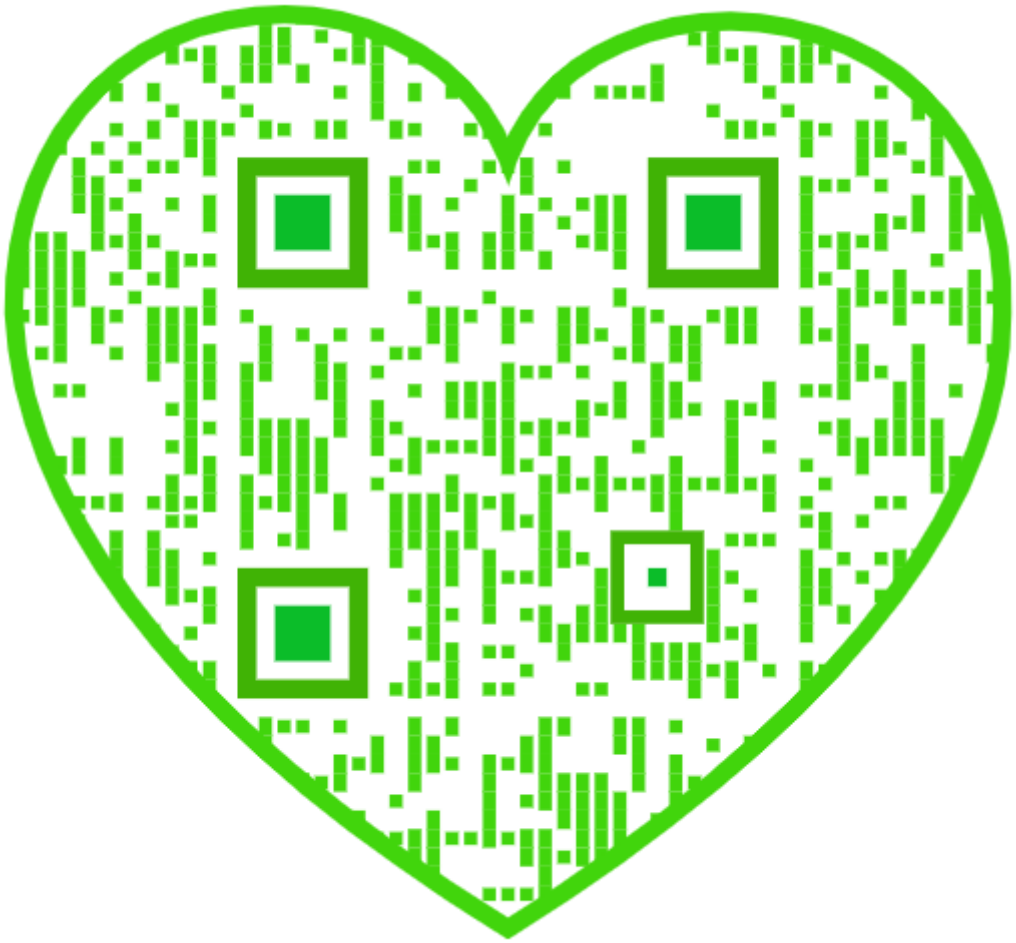

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THE

DISEASES OF LIVE STOCK

AND THEIR MOST EFFICIENT REMEDIES;

INCLUDING

HORSES, CATTLE, SHEEP AND SWINE.

BEING

A POPULAR TREATISE, GIVING IN BRIEF AND PLAIN LANGUAGE A DESCRIPTION OF ALL THE USUAL DISEASES TO WHICH THESE ANIMALS ARE LIABLE, AND THE MOST SUCCESSFUL TREATMENT OF AMERICAN, ENGLISH AND EUROPEAN VETERINARIANS.

BY LLOYD V. TELLOR, M.D.

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PREFACE.

The author of this work, though not a veterinary surgeon, believes he can claim some special qualifications for its preparation. Brought up on a farm, practicing medicine in a rural locality, and, as is the wont with country doctors, often consulted about the diseases of domestic animals, he has bought and read the best books on the subject, and here presents the combined result of his study and observation.

While the work has been written in language free from technicalities, and directly for the use of the farmer and stock owner, the endeavor has been made to render it scientifically exact, and a true exponent of the latest and most accurate research. Comparatively little space has been given to pathology, as this branch can only be studied by experts; but on treatment the work is very full, because this is so much neglected in most books, and yet is precisely what the general reader desires.

As will be seen, free use has been made of the works of Professor William Williams, Finlay Dun, John Gamgee, George Armitage, Dr. Klein, and other British authors; and of the writings of Law, Townshend, Chawner, Detmers, Moks, Harris, etc., of our own country.

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General Principles of Veterinary Medicine.

CHAPTER I.

REMARKS ON THE ANATOMY AND PHYSIOLOGY OF DOMESTIC ANIMALS.

The Brain and Nervous System—The Organs of Breathing—The Organs of Digestion—The Heart, Blood-vessels and Absorbents—The Kidneys and Sex Organs—The Reproductive Acts.

When one undertakes to repair a machine he should know something about its construction; and in like manner an acquaintance with anatomy and physiology is justly deemed necessary to the proper treatment of diseases.

It is not, however, our purpose to enter into those abstruse sciences to any great extent; but it will be profitable to consider in broad outlines, and in language free from technicalities, the structure and functions of the four species of animals, the horse, cattle, the sheep and the hog, whose diseases it is our main purpose to describe in the pages of this book. In doing so we shall proceed in the same order in which the diseases themselves will be classified when we come in turn to study them.

THE BRAIN AND NERVOUS SYSTEM.

The cavity of the skull is filled with the *brain*, which is the organ of intelligence, of voluntary motion, and of the senses. The impressions on the senses are conveyed to the brain by the *nerves*, delicate branches of which are found in every part of the body. These branches unite and increase in size as we follow them up, until they reach what may be called the parent stem, which is the *spinal cord*, occupying the cavity in the backbone. This is attached to the brain at its base, so that every nerve fibre connects directly with the brain itself.

The nerves of sight, of hearing, of taste and smell are adapted to convey the impressions of these senses only.

In addition to this chief system of nerves, called the "cerebro-spinal" system, there is a lesser one, known as the "sympathetic" nerve system, which is distributed chiefly to the deep lying organs in the chest and abdomen, and to the blood-vessels. It is supposed to control the involuntary motions of those organs.

The brain of the horse is small for his weight and the size of his head, weighing about thirty ounces, which is less than the smallest sized adult brain in man; while the brain of the ox is still less, weighing about one-half that of the horse.

As it is so much less active an organ in the lower animals, it is much less apt to become diseased than in the human race. When its surfaces become inflamed, it leads to "mad staggers," a sort of delirium; and when with this the spinal cord is attacked, the disease is that fatal and epidemic one known as "cerebro-spinal meningitis." Pressure of blood on the brain either by overfilling of the blood-vessels or by their bursting produces a stupid dull condition, passing at times into complete unconsciousness, as we witness in "sleepy staggers," sunstroke and apoplexy.

The nerves respond to the diseased condition of the brain either by excessive and violent action, as displayed in the spasms of megrims, epilepsy, lockjaw and hydrophobia; or else by a more or less complete loss of their power of conveying sensation and motion, as in the varieties of palsy.

What physicians call "diseases of the mind," as insanity and idiocy, do not seem to occur in the lower animals; although instances are recorded where horses have apparently deliberately committed suicide, which would appear to be an evidence of hypochondria.

THE ORGANS OF BREATHING.

These consist of the lungs, and the tubes through which air is conducted into them. The lungs are composed of millions of little sacs or vesicles, each vesicle opening into a minute tube, which tubes unite to form others of larger calibre, called bronchi; and finally all the bronchi join the lower end of the windpipe or trachea, which continues up the throat to the mouth. The lungs do not lie immediately against the walls of the chest, but against a close membranous sac called the pleura, which lies between the lungs and the ribs.

The act of breathing differs in frequency in different animals. In the horse it averages in health ten or twelve times a minute, in the ox twelve or fourteen times, in man sixteen or eighteen times. It should also be quiet and regular, and any deviation from these natural conditions is justly regarded with suspicion. A warranted horse is held to be especially guaranteed "in *wind* and limb," any defect of the breathing organs being mentioned first as of first importance.

When the minute vesicles of the lungs are inflamed we have the disease called inflammation of the lungs, lung fever or pneumonia; when the inflammation is in the tubes or

bronchi, it is called bronchitis; when in the upper windpipe, sore throat. Pleurisy is an inflammation of the membranous sac we have described as the pleura. Asthma, roaring, thick wind, broken wind, heaves and other disorders of the breathing arise from alterations in the nerves and tissues of these organs; while consumption, although a general disease of the system, most frequently, both in men and horses, leads early to a softening and breaking down of the substance of the lungs.

THE ORGANS OF DIGESTION.

These include much more than the stomach and bowels. The digestion of food really begins in the mouth, where it is ground by the teeth and altered by the chemical action of the saliva. Therefore we include under this heading, the mouth, teeth, throat, gullet, stomach and bowels.

It is in this part of the system that the herbivorous animals differ most from those which eat flesh only, and those which eat both flesh and vegetable food. The chemical processes which can convert dry hay to rich blood and firm flesh are wondrously complicated and require an extensive laboratory. This is furnished by a remarkable length of intestine and generally by several stomachs. In man the intestines are six or seven times longer than his body; in the pig they are thirteen times longer; in the sheep they are twenty-eight times; in the ox twenty-two times; in the horse but ten times the length of the body. Yet this gives the horse an intestinal tube *ninety feet* long, and capable of containing more than a barrel of fluid.

The teeth, in both the horse and the ox, as in the child, appear at first in a temporary set called "milk teeth," which are followed by permanent ones, the change being completed in both animals about the fifth year of life. The horse has forty teeth, the ox and man thirty-two. As in the human

mouth, there are in the horse three kinds of teeth, the front teeth or incisors, called the "nippers; the canine teeth, called "tushes;" and the molar teeth, called "grinders." The appearance of the teeth and the amount of wear they disclose, enable those acquainted with their development to decide positively of the age of a horse within one year up to nine years of age. But a discussion of this subject does not come within our province.

The horse has but one stomach, while the ox and the sheep have each four. They are in both animals known by the same names. The first is the paunch or rumen; the second is the honeycomb or kingshood; the third is the manyplies or omasum; the fourth is the red, the rennet or the abomasum. The first three communicate with the gullet by a common opening. The "cud" is contained in the first and second stomachs, and after it has been masticated a second time it passes to the third and fourth, and to the bowels, to undergo the further process of digestion.

This is accomplished by the peculiar action upon it of the secretion of the fourth stomach or rennet, an action familiarly known by the use of rennet in the kitchen, and of "pepsin" in medicine, which is obtained directly from this stomach; and after it passes into the bowels by the secretions of the liver and pancras or sweet bread.

Thus prepared, it comes into contact in the long course of the bowels—two hundred feet nearly in the ox—with countless little absorbing points called "villi," which take up the food now changed to a large extent to a thick fluid, leaving the insoluble and undigested portions to continue down the tube to the rectum or anus, whence they are periodically discharged as feces or dung.

As may readily be conceived, this intricate and delicate process is easily disturbed, and hence loss of appetite, impaired digestion, and irregularity of the bowels accompany

nearly every disease on the catalogue. Improper food, and too little or too much exercise bring on indigestion or dyspepsia, in which complaint there may be one or another form of disturbance. Colic, gripes or hoven is an accumulation of air or gas in the stomach or bowels, painfully stretching their walls. Scouring is a too free and watery action of the intestines; dysentery and enteritis are when the intestines are inflamed; and obstruction occurs when through hair-balls, rupture or twistings their passage is choked up.

THE HEART, BLOOD-VESSELS AND ABSORBENTS.

The digested food, we have seen above, is taken up in the intestines in the shape of a milky fluid by innumerable absorbent points or villi. What do they do with it? They pour it into the absorbent vessels or lymphatics, which empty into larger and larger ones, and so on until the whole of the nutritive fluid is collected into one great duct or tube, which extends forward and pours its life-giving contents into the large veins at the base of the neck, whence it is conveyed to the heart and enters the general circulation of the blood.

And this circulation, what is meant by it? It means that the blood is drawn in and driven out of the heart by its powerful throbs, with such force and rapidity that the whole of it in the body makes the circuit of the system in less than three minutes, washing out the dead and worn out particles, discharging them by the lungs, kidney and liver, and purging and brightening itself in the fresh air drawn in by the lungs for another such rapid and purifying race.

The parts concerned in this circulation are the *heart*, the *arteries* and the *veins*. The arteries lead *from* the heart; the blood they carry is bright red, and it flows in waves, felt on the pulse, and shown when an artery is cut by the blood spouting in jets or spurts. The veins lead *to* the heart; the

blood they carry is dark red, and it flows in a steady, regular stream. The arteries divide and subdivide into innumerable branches, diminishing to a size where it takes the strongest microscope to discover them, which are collected again into larger and larger branches to form the veins.

These smallest divisions are the *capillaries*, and it is while in them that the blood alters in color from a bright to a dark red, by undergoing the changes necessary to keep up the life of the tissues through which it flows.

Thus the blood is returned to the heart dark and dull, and loaded with worn out matter. It enters the right side of the heart, which has two cavities wholly separate from two similar ones on the left side. It is at once driven to the lungs, where it is spread over the delicate thin walls of millions of vesicles and exposed to the air inhaled at each act of breathing; it throws out carbonic acid gas, absorbs oxygen, and returns to the left side of the heart fresh and bright once more, and ready to recommence its journey. And so it continues its endless round till death stops it forever.

In the human race diseases of the heart and blood-vessels are common, but in the lower animals they are rare. No doubt the erect position of man, which demands heavier labor from the heart, is partly a cause of this; another is his greater nervous excitability, and his intemperance. In both species, inflammatory rheumatism is often followed by a change in the valves and walls of the heart.

Practically, it is of great importance to be able to distinguish bleeding from arteries from bleeding from veins by the color of the blood. For venous bleeding will usually cease by simple measures; but arterial bleeding requires the ligature.

When the amount and quality of the food is largely in excess of the needs of the system for repairing its waste by

exercise, the blood is said to be "too rich," and the animal increases in fat, and may become sluggish and torpid. This state of plethora or "over-condition," though not actually a disease, is not one of the most perfect health; and though it suits well for stall-fed steers, it is injurious to milk-cows and work or racing horses. It is counteracted by lower diet, more exercise, a brisk purge, and in racers by the process of "sweating" them under the saddle and sweat-cloths.

THE KIDNEYS AND SEX ORGANS.

The kidneys are the organs which secrete the urine from the blood. The fluid flows from them through a duct into the bladder, whence it is expelled from time to time. The urine of horses has a peculiar, strong unpleasant odor, and a bitter, salty taste; the urine of cattle is clear, of a pale yellow color, of a bitter taste, and a strong alkaline reaction. The urine of the sheep and the pig resembles that of cattle.

The sex organs in the male horse are the sheath, the yard and the testicles. In the gelding and the steer, the latter are removed by the operation of castration.

In the female the sex organs are the uterus or womb with its appendages, the ovaries and the vagina, which is the passage which conducts to the womb. In mares this is about eighteen inches long. In the operation of spaying, the ovaries are removed, which renders the female barren, and usually destroys her sexual desires.

These desires in the female lower animals are only manifested, when in health, on certain periodical occasions, known as the "œstrum," when the animal is said to be "in heat." This is manifested by restlessness, calling the male, signs of congestion and irritation about the sex organs, and by the discharge of a fluid from the vagina, which is said to have a characteristic and penetrating odor in the highest degree exciting to the perfect male.

The mammary glands or udder is an appendage of the sex organs in the female. It is brought into action after fertile connection and reproduction have been accomplished—though the secretion of milk is possible without these.

Although the horse, ox and sheep are strictly herbivorous animals, they live, when young, on animal food in the form of milk; and it is the desire by man to partake of this food that leads him to give so much attention to the breeding of cows in this country and of mares in Asia.

The diseases of these organs form a very important class. Disturbances of the urinary secretion are by no means uncommon in our domestic animals. Diabetes or excessive urination is a familiar example; "red water" and "black water" are known in both horses and cows; and inflammatory affections of the bladder and kidneys, though not frequent, are always troublesome.

With regard to the sex organs, the difficulties and complications of pregnancy and parturition demand careful study on the part of the stock owner; and disorders of the udder, the treatment of milk fever, and the management of newborn calves are subjects with which every one having the care of domestic animals should make himself acquainted.

Another and important topic, which comes appropriately in this connection, is the effect on the health of stock of *breeding in-and-in*. As a predisposing cause to certain very dangerous diseases, it has not received in the United States, at least, the attention it should have.

The ill effects of close breeding are seen less in the horse, than in cattle and sheep. In cattle the extremities become delicate, the hair smooth and fine, the ears thin, and the general sensitiveness increased. The animal becomes more subject to various diseases, especially of the lungs, and to what are called "clayers" in the throat. The English herd books give instances where once famous herds have de-

generated and become extinct by persistent in-and-in breeding.

In sheep the effects are to produce fine and delicate extremities, to bare the head of wool, and to render the ears thin and red. The animal becomes very susceptible to cold, and uncommonly subject to such diseases as flukes and foot rot.

THE REPRODUCTIVE ACTS.

In regard to the development of the reproductive powers, the domestic animals differ widely.

The mare begins to breed at four years of age and carries her young 340 days from the time of conception to its natural delivery. She may safely be worked to within two weeks of that time, but should have rest for three or four weeks afterwards. The foal should be weaned at five or six months of age.

The youngest age at which the heifer should be put to the bull is laid down by the best English breeders at one year and eight months. She carries her young the same length of time as the human female, to wit, about nine months. The most favorable period for calving is in the spring. For five or six weeks previous to its occurrence her milk should be dried, and during the whole period of gestation, she should be underfed rather than overfed, too rich diet being a very common cause of abortion. The calf should have nothing but the teat for three or four weeks, when it may begin with skimmed milk, etc.

Both rams and ewes are ready to breed at fifteen months of age. The ewe carries her young one hundred and fifty-two days. When born, it is often very delicate and requires the attentive care of the shepherd to survive.

The sow should breed at one year of age. Her period of gestation is 113 days, and it is a prudent precaution to sepa-

rate her from the rest of the herd for one week before her farrowing is due. In three weeks from their birth the young pigs begin to eat other food than the milk of the sow.

CHAPTER II.

NURSING, CARE AND DIET OF SICK ANIMALS.

Separation and Stabling—Disinfection—Rest and Sleep—Cleansing and Dressing—Position, Slings and Cradles—Food and Drink—Special Diet Preparations.

As in the human species, so in the domestic animals, very much of the success of medicines depends upon intelligent nursing; and the most approved skill of the veterinarian will fail utterly, if the principles of hygiene and sanitation are neglected. These principles we shall now specify.

SEPARATION AND STABLING.

Whenever an animal is seen to be ailing, it should be separated from others and placed in a lot or pen apart, or in a stall at a distance from others. This is especially important when contagious diseases are prevalent, but it should be a rule at all times and in every instance.

The stall chosen should be roomy, well drained and ventilated, free from the odors of decaying animal or vegetable matters, moderately lighted and quiet. The temperature to be preferred is about 60° or 65° Fah.

A loose box is preferable to a stall, when it is to be had, as it allows an animal more liberty of movement, and permits him to assume any position which is most comfortable. The

floor should be well littered with clean straw which should be changed as often as it becomes foul with the discharges. Surface gutters are to be preferred in all instances to traps or sink holes, as the former allow the discharges to be rapidly and thoroughly removed.

In some systems of ventilation, especially that by a tube or shaft descending from the roof, and that by open doors and windows, there is danger, especially at night, of a current of raw cold air striking the animal, and chilling it to a dangerous degree. Louver windows in the roof or under the eaves, if properly made, are less objectionable; and best of all is a ventilating shaft which has its opening within a foot or two of the floor, the current in which is maintained by a revolving ventilator at the top.

DISINFECTION.

Should never be neglected. The walls should be frequently whitewashed, and the discharges deodorized by the use of sulphate of iron (copperas), which is a cheap and efficient agent for the purpose. A handful may be dissolved in a bucket of water and thrown into the drain.

More efficient is the chloride of zinc (butter of zinc), which may be dissolved in water in the proportion of an ounce to one or two gallons. It is very effective, and not liable to be absorbed.

In contagious cases it is of the first importance that the infecting germs be destroyed as soon as they are produced, and before they have had a chance to spread the contagion. The attendants on such cases should not handle or approach healthy animals, when it is possible to avoid it.

The sheds or stables occupied by such animals should be fumigated with *sulphur* two or three times a week. The fumes should not be strong enough to set the animals cough-

ing. If mixed with tar, the gases generated by the combustion of the two form the most active atmospheric disinfectant now known to science.

No. 1. Flowers of sulphur, ½ lb.
Wood tar, 1 qt.
Mix with tow.

This much, burned at one or two spots, will be enough to disinfect a shed one hundred feet long and twenty wide.

Carbolic acid in its impure liquid form is conveniently applied with a brush over the doors, walls and troughs, and may also be applied to the hooves of the animals. Rugs or blankets may be wet with a weak solution of it and hung around, to attract and destroy any disease germs floating in the atmosphere. It also has the advantage of being disagreeable to flies, which in the summer time are otherwise sure to attack and annoy the sick animal.

Chloride of lime is also a popular disinfectant, but apart from it being generally highly disagreeable to animals, it is not so active as those we have already mentioned.

The value of disinfection is no longer open to discussion. It has been shown beyond controversy that over and over again such malignant maladies as the foot-and-mouth disease, the cattle plague and black quarter have been stayed in their ravages and prevented from extending by a free, constant and wise use of these potent agents. We add formulas to prepare a number of them besides those already mentioned, so that one may be obtained when another is not convenient.

No. 2. Sulphate of iron, 2 parts.
Sulphate of zinc, } each 1 part.
Tan or oak bark in powder, }
Mix with tar into balls the size of the fist, and put into drains, cesspools and sink holes.

No. 3. Dry chloride of lime, 2 parts.
Burnt alum, 1 part.
To be set in shallow dishes about the stables &c. This is known as "Collins' Disinfecting Powder."

No. 4. Common salt, 2 lbs.
Oil of vitriol, 1 pint.

Pour the oil of vitriol slowly in the salt, and muriatic gas will be evolved, which is a powerful disinfectant. Recommended by the Cattle Plague Commission.

What are known as the "disinfecting powders," which are preparations of carbolic acid by McDougall, Calvert and other makers, are sprinkled daily throughout the extensive stables in London and Liverpool, at an annual cost of only one dollar and a quarter for each horse. They keep the flies away and the atmosphere pure.

REST AND SLEEP

Are great restoratives to the exhausted system. Hence the attendant on the sick animal should be careful to secure these. Horses are nervous creatures, and cannot sleep soundly where there is much noise. When sick, no one should be allowed to walk about on a floor overhead, especially at night; the stall should be darkened, and the crowd of passing visitors which generally collects, should promptly be dispersed.

Especially is this true of all diseases of the brain and nervous system; to such a degree, indeed, that the prescription in tetanus (lockjaw) of an eminent veterinarian is for the owner of the animal to lock the stable door, put the key in his pocket, and not approach the place again for three days.

This general rest is to be carried further, to rest of the part which is diseased. If the digestive organs are inflamed the simplest and blandest food and not much of that is to be allowed; purgatives are to be withheld as only adding fuel to the flames. If the eye or the foot is inflamed, shading from the light is demanded in the first, and entire freedom from motion in the second case. But when acute disease has

passed away, the gradual use of an affected part generally does good.

CLEANING AND DRESSING.

A sick animal should be kept scrupulously clean. This is neither an easy nor a pleasant task, especially with cows and cattle suffering from dysentery and other scouring diseases. They lie down and obstinately refuse to move even to get out of the way of their own discharges. They must be well bedded, and gentle but sufficient force be used to wash them thoroughly once a day. When the condition is one of fever, if the body is sponged several times a day with some vinegar added to tepid water, great comfort will result, and the hot and dry condition of the skin be much relieved.

Harsh rubbing, scraping, and the currycomb are not the means to use in cleansing a sick animal. Plenty of warm water and the handbrush, followed by the cloth, are what are needed.

In feverish diseases and inflammations both in horses and cattle, and in recovery from exhausting attacks of all kinds, a warm rug or two and bandages to the legs help to maintain an even temperature, and combat congestion of the internal organs.

In putting on bandages the art is to avoid unequal pressure, and yet in giving sufficient to afford gentle support and to distribute equable heat. The bandages are usually of flannel or some other woolen material. They, as well as all other clothing, should always be removed twice daily, the skin washed off and rubbed, and the covering promptly re-applied.

Attention to the hair is a very important question in dressing, especially in horses. There has been a prejudice, and we believe an entirely unfounded one, in this country against "clipping" horses. Yet as a measure of comfort in

health, and improvement in disease, we believe it a very desirable procedure. Not to discuss the question we shall simply quote the words of that very eminent authority, Prof. W. Williams, Principal of the Veterinary College of Edinburgh. He says: "With reference to the clipping of horses, I am of opinion that it is a great advantage; they work better after being clipped; thrive on less food; are less liable to disease; and when sick recover in a much shorter time." Frequently, therefore, it is a part of good nursing to clip them.

When this is not done, it is often of advantage to cut away the hair at the fetlocks, and under the chin, and trim the main and tail. Many horses which are "hide bound," out of condition, mangey, and generally run down, will recover forthwith as soon as they are clipped and closely trimmed.

In all instances the feet should be looked to. The shoes should be removed, and a "stopping" of equal parts of cow dung and clay be used in horses; while in cattle it is well to paint the hoofs with tar, or impure carbolic acid.

POSITION, SLINGS AND CRADLES.

A horse has generally a nervous fear about lying down when sick, on account of the increased difficulty he experiences in breathing in that condition; hence he is apt, when he can no longer stand, to give up the struggle in despair and to die when his attack is not necessarily mortal. This is not the case with cows and cattle, as they spend much of their time reclining, and as a rule adopt that position early in their sickness.

Of course, when the leg or foot is seriously diseased, the horse finds far greater comfort lying, and then it is bad management to prevent him doing so. But otherwise we incline to believe a horse should be encouraged to stand as long as

possible. It is his natural position in sleep, and it is not nearly so fatiguing to him, even when extremely debilitated, as some kind hearted people but of slight anatomical knowledge, have asserted.

In fact, no stable is complete in its appointments that is not provided with the apparatus known as "the sling," in which to support in an erect position a horse unable or unwilling to stand. The use of this alone will cure some cases, and is absolutely indispensable for the successful treatment of many others. The simplest form of the sling, as recommended by Prof. Law, is as follows:

Four strong posts are fixed to the ground and roof so as to form an oblong, inside which the four feet of the animal may stand. A strong horizontal bar is then fixed to the two posts on each side, at such a height as to correspond to the middle of the body. Then the animal being walked into the frame, a horizontal bar is fixed between the two front posts so high as to cross the lower part of the neck, and another between the two hind posts at about the height of the stifle. Next a strong piece of sailcloth or other firm material strengthened by small ropes, is fixed to the bar on one side by being wound around and nailed to the outer side, and having been passed beneath the body is nailed to the bar on the other side in the same way. It must be just sufficiently far back to clear the fore limbs, and just so loose as to allow the patient to stand over it without pressure or chafing, or to settle himself into it at will. In the male care must be taken to have it narrow enough not to cover the sheath.

It is often necessary to allow an animal to become fatigued by standing for a day or two before being put in a sling, otherwise he may be very irritable at first. Care must be taken not to let him feel the sling beneath him until it is ready to be fixed, as many patients will settle down into it the moment it is felt.

Another and in some respects preferable plan, is to take a strong piece of sailcloth of the width of the distance from the sheath to behind the fore limbs, and of a length equal to the girth of the horse. Wrap each end twice around two-inch rollers of wood and nail them securely, and work a two-inch wide buttonhole in each end of cloth just beneath the middle of each roller. A rope and tackle should now be

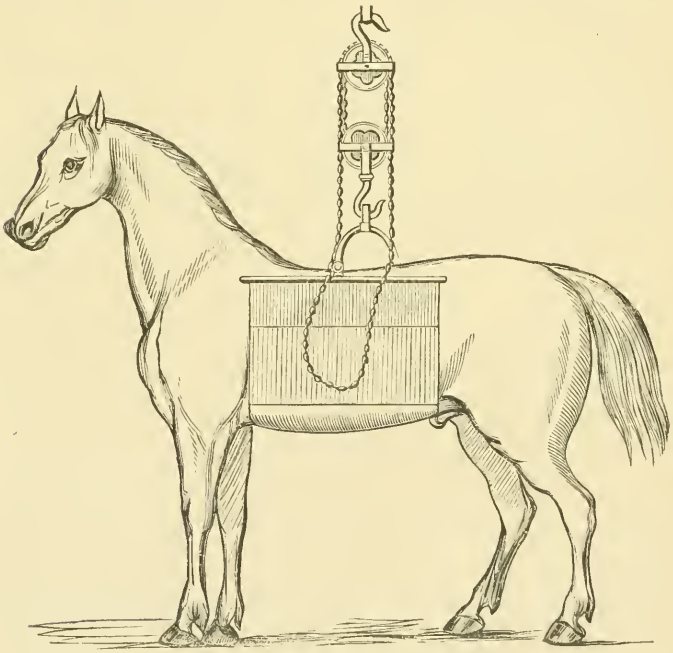

FIG. 1.—A HORSE IN A SLING.

fastened securely to the ceiling of the stable and a ∩ shaped hook of bar-iron be obtained from the blacksmith, the upturned ends of which are to be inserted in the buttonholes, and the central portion of which is connected with the pulley, and thus the horse raised or lowered at pleasure. Breast straps and breechbands can be added as desired.

Cradles are used in cases of fracture of the bones of the jaw. Some are elaborately made of steel bands and leather straps; but any inventive person can devise one from thin and strong strips of wood and firm bandages, the object in all cases being to maintain the fragments of the bones in their natural positions until union has taken place between them. Hatters' felt, stiffened with shellac, and hard rubber in sheets, either of which can be moulded to the part when moistened with hot water, are useful in such cases.

FOOD AND DRINK.

In sickness food requires to be given with special care and in an easily digestible form, for in all serious diseases the digestive powers are impaired. In not a few complaints of a feverish character, both of horses and cattle, the ordinary grains and dry fodders are not readily digested, and consequently give rise to derangement of the stomach and bowels. Such patients should be fed on mashes, gruels and other soft food, to which milk and eggs can be added when active nutrition is demanded.

Food should never be allowed to lie long before a sick animal. If not promptly consumed it should be removed, and in a couple of hours or less time another supply be furnished. In most cases of disease, it is better to give small quantities at a time, and have it often repeated. With returning appetite, a convalescing animal will often eat more than is good for him, and thus bring about a relapse of the disease. With the horse, it must be remembered that his stomach is small for his size, and that even in health he does not bear hunger nearly so well as man, and requires food as often as every four hours. He also urgently desires a change of diet, neither grain nor clean hay alone fully satisfying his craving.

Unless when affected with diarrhœa, dysentery or diabetes, animals do not injure themselves by taking too much water, but are often rendered uncomfortable and recovery retarded by undue restriction in this direction. A supply of water, cool, clean soft water, should always be within their reach, except in the diseases mentioned, when the quantity must be limited. Small quantities given often will allay thirst much more certainly than large quantities at long intervals. The horse is especially delicate about drinking water, and when sick, neither hard nor dirty nor tepid water should be offered him; and if the nitre, etc., often added to the water appears distasteful, it should be omitted.

In all instances a lump of rock salt should be placed in the feed trough for him to lick at, at his pleasure.

SPECIAL DIET PREPARATIONS.

These, for animals, mostly consist of mild, nutritious or cooling drinks, and mashes.

An excellent substance for them is *linseed*, either in the form of gruel, tea or cake. It is soothing, palatable, easily digested, and moderately laxative. Oat meal, ground corn, barley and bran, are other useful forms of grain suitable for special diet. We add recipes for a few of their preparations.

Linseed Tea.

No. 5. Bruised linseed, 4 to 6 oz.
Boiling water, 1 gallon.

Simmer for two hours, strain and add a few spoonfuls of molasses or honey.

Linseed Mash.

No. 6. Linseed, 2 qts.
Sugar, 2 oz.
Boiling water, 6 qts.

Simmer for several hours on a slow fire.

Barley Water.

No. 7. Barley, 1 lb.
Water, 2 galls.

Boil to six quarts, strain, and add a teacupful of molasses.

Malt Mash.

No. 8. Ground malt, 1 peck.
Boiling water, 1½ gall.

Stir frequently, and give when milk warm. This is a nutritious mash, valuable in debility.

Bran Mash.

No. 9. Bran, ½ peck.
Boiling water, enough to scald it thoroughly.

Stir and give when milk warm. Softening and laxative.

Oatmeal Gruel.

No. 10. Oatmeal,
Water, each, ½ pint.

Mix well together, then add to one gallon of boiling water, and boil for a few minutes.

No. 11. Fresh eggs, 4.
Fresh milk, 2 qts.

Beat together, and give milk warm. A concentrated form of nourishment in exhausted conditions.

CHAPTER III.

FORMS OF MEDICINES, AND METHODS OF THEIR ADMINISTRATION.

List of Forms and Methods—Medication by the Mouth—Injections into the Nose—Medication by the Rectum and Vagina — Medication by the Blood-vessels — External Methods of Medication— Weights and Measures, and their Domestic Equivalents.

Medicines can be conveniently administered to the lower animals by a number of different methods, which may be classified into *internal* and *external*, as follows:

Internal Methods.

1. By the mouth or nostrils, in the form of
   - Balls or boluses.
   - Powders.
   - Drenches, draughts or drinks.
   - Vapors, sprays and fumes.
   - Snuffs.
2. By the rectum or vagina, in the form of
   - Injections, clysters or enemas.
   - Suppositories.
3. By the blood-vessels, in the form of
   - Subcutaneous or hypodermic injections.
   - Injections into veins.

External Methods.

In the forms of
- Lotions and liniments.
- Poultices and fomentations.
- Ointments, plasters and charges.

MEDICATION BY THE MOUTH OR NOSTRILS.

A **ball** or **bolus** is made by mixing the medicine to be given with linseed meal, molasses or soap, to bring the mass to a consistency of a thick paste, and then rolling it out in the shape of a small cylinder, about two inches long by a half or three-quarters thick. These can be wrapped in oiled paper or coated with sugar or gum. For horses this is the most common and handy method of giving medicine. What is called "common mass" is a mixture of equal parts of linseed and molasses, and is much used for giving a proper consistence to other drugs.

The ball may be administered either with the aid of the balling iron or with the fingers, and the latter plan is generally preferable. The operation is as follows:—

The ball is held by one end in the right hand between the thumb, which supports it below, and the fingers above, the

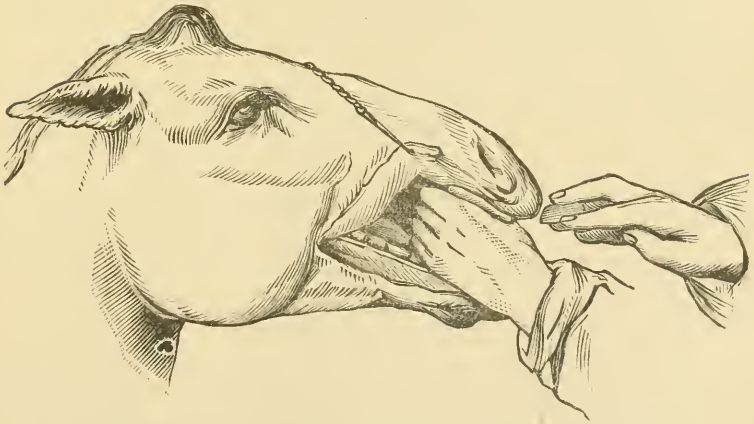

FIG 2.—MODE OF ADMINISTERING A BALL BY THE HAND.

hand being drawn together and rounded as much as possible. The horse's tongue is gently drawn out a little way by the

left hand, and the ball passed rapidly along the roof of the mouth, and dropped on the back of the tongue. The hand is quickly withdrawn, the tongue returned to the mouth, the jaws closed and the head for a couple of minutes held slightly elevated, and the side of the neck watched to see the ball swallowed and pass down the throat.

In performing this operation it is well to observe the following rules:—

1. Take the horse out of his stall, and let him have a halter on, held by an assistant.

2. Stand on the off side of the horse's head, and be sure to hold the tongue so that in any movement the horse may make, you have a support for the hand against the lower jaw.

3. Do not pull on the tongue, and let your movements be quiet but rapid.

With vicious horses, those with small and narrow mouths, and in certain diseases, as lockjaw and mad staggers, *balling irons* have been devised, by which the mouth is kept open,

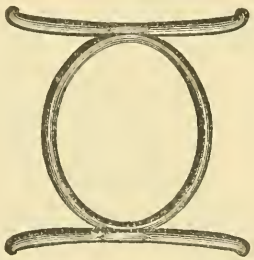

FIG. 3.—SIMPLE FORM OF A BALLING IRON.

and the ball can be given with safety. The above is a simple form which can readily be made of iron by any blacksmith, of size to suit.

The ball is sometimes fastened loosely to the end of a small stick, and thus carried to the back part of the tongue.

Vapors, Sprays, and Fumes are forms of medicines drawn in with the breath. They are easy of administration, and of much wider use than most veterinarians take advantage of. Among them, the *anæsthetics*, chloroform and ether, take the first rank. A sponge in a loose net may be fastened over the head of the animal, the mouth having previously been muzzled, and the anæsthetic poured on the sponge; or it may be simply held to the nose.

In many diseases of the throat and windpipe, as catarrh, sore throat and strangles, steam, either pure, or from water containing vinegar, laudanum, belladonna, sulphurous acid, and the like, will give great and prompt relief. The steam is readily evolved from a well made hot bran mash placed in a roomy nose bag; or the head of the animal may be held over a bucket of hot water, plain or medicated, from which the steam is driven off by plunging a hot iron into it at short intervals.

Vapors can readily be produced in any liquid substance by placing it in what is called an *atomizer*. The most convenient of these is the form worked by the hand called the "hand ball atomizer." For diseases of the nostrils, mouth and throat this is a valuable instrument.

For disinfecting purposes and for treating the lining membrane of the breathing organs, inhalations of smokes and gases are of service. Flowers of sulphur on hot coals will soon fill a closed stable with sulphurous acid, a medical and disinfecting agent of great power; burning tar is asserted by many to give off fumes very beneficial in chronic cough; chloride of lime evolves an odorous gas of value in contagious diseases, and which keeps away flies and mosquitoes.

Snuffs are used to bring on violent expulsion of the secretions of the nostrils, thus clearing the air passages, or as a local application to diseases of the inner surface of the nose. There is a small apparatus used to throw them up, consisting

of a tube and a hollow rubber ball, by pressure on which the powder is forcibly driven up the nostrils or down the throat. But a hollow reed charged with the powder with a piece of rubber tubing and mouthpiece, blown forcibly by the operator, will answer quite as well.

MEDICATION BY THE RECTUM OR VAGINA.

Injections into the rectum are frequently used in animals for constipation, piles, colic, and whenever the object is to keep the bowels in order. Their use will often take the place of purgative medicines given by the mouth. In thread worms they are the only measures worth resorting to. When tepid and with the addition of laudanum or belladonna they will relieve irritation of the kidneys, bowels and womb. After giving birth, mares and cows are frequently benefitted by having the vagina washed out with a mild disinfectant, as a weak solution of permanganate of potash or sulphurous acid.

When intended to be retained and absorbed, injections in the horse and ox should not exceed two or three pints; but when the object is to produce evacuation of the bowels, three or four times this amount may be used. In case of obstinate obstruction of the bowels very large injections with an extra long tube are required, and are generally successful, if commenced early.

Quite a variety of apparatus has been invented to give injections. The ordinary barrel syringe is often used. The ball syringe is more convenient, as it saves all pumping and refilling. Probably better than all is the "Fountain Syringe," which works by the force of gravity. An open rubber bag, holding half a gallon, may be suspended several feet above the animal's back; from this a half-inch tube of rubber or leather, the end of which is well oiled and inserted into the rectum, conveys the fluid into the gut without any exertion

and in any desired quantity. It is a mistake to suppose any force is required. The fluid will fall by the force of gravity, and as the intestinal canal is in animals when standing, lower than the outer opening of the gut, the injection will slowly but surely penetrate without the use of force.

Another useful instrument on the same plan is Professor Gamgee's Funnel. It consists of a straight metallic tube, 12 inches long, tapered and rounded off at one end, bent at a right angle at the opposite extremity, which supports a broad funnel about 6 inches deep and 7 in its greatest diameter. Its extremity should be oiled and introduced into the rectum, and the fluid poured into the funnel. The injection may be repeated every quarter of an hour until relief is experienced.

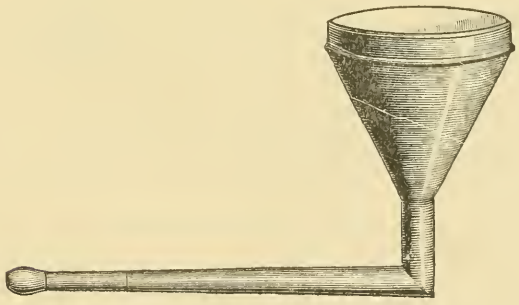

FIG. 4.—PROF. GAMGEE'S FUNNEL FOR INJECTION.

Suppositories. Almost all medicines may be given to animals in the same doses, by the rectum as by the mouth. They may be made in a solid form, something like a ball, by means of soap, lard, or starch, and are then called suppositories. A cylinder of soap introduced into the rectum of young foals and calves encourages the action of the bowels and ducts more promptly than a purge. Suppositories may be made with disinfectants and introduced into

the vagina of cows after calving to purify the discharges and lessen the danger of puerperal fever.

MEDICATIONS BY THE BLOOD-VESSELS.

The most safe and convenient plan to introduce medicines into the system is by the *hypodermic syringe*. This is a small syringe, holding a few teaspoonfuls, with a long needle-like point, through which a delicate canal is pierced.

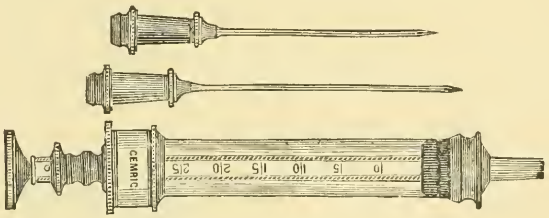

FIG. 5.—THE HYPODERMIC SYRINGE.

This has been used extensively for many years in human patients, and is even better adapted to animals, on account of the difficulty of forcing them to take remedies, and the more prompt and certain action of the subcutaneous method. Of course, very concentrated forms of medicines are used, as but a few drops or a half teaspoonful are thrown by the syringe at a time. But modern chemistry offers such potent and intense preparations that this is no objection.

In giving a hypodermic injection it is not very important what part of the animal we choose, though the general rule is to select a point near the seat of disease. It is best to shave or clip the hair for a space of a few inches; next, pinching up the skin a slight cut is made in one end of the little ridge thus elevated and the nozzle of the syringe inserted and pushed its full length, parallel to the surface, in the loose tissue beneath the ridge; then it is withdrawn half way and the contents of the syringe thrown slowly and

steadily into the canal thus made; finally the syringe is withdrawn, and the finger held for a minute over the wound to prevent the fluid escaping. This slight and almost painless operation can after a little practice be performed with such ease, that it cannot but become a favorite method of administration. We shall give the doses and preparations called for in many disease, by this plan.

Injections into the veins have been at times employed with success. The jugular vein, which is easily accessible in all animals, underneath the skin at the upper part of the neck, is the one selected by preference. It is opened with a common fleam, and the liquid injected with a syringe. Only small quantities can be used in this manner. They should be well strained and clear, and warmed to the temperature of the blood, which is 98° Fah. Milk and the blood of healthy animals can be thrown into the veins of weak and exhausted ones, and often the system is much benefitted. But beyond this, the use of intra-venous injections is likely to be limited.

EXTERNAL METHODS.

Lotions are fluid preparations generally made up extemporaneously and used for washing or bathing the part. For bruises and sprains cooling lotions are prepared with nitre, sal ammoniac and water, vinegar and water, dilute alcohol or simple cold water. Astringent lotions containing tannic acid, sugar of lead, etc., are valuable in moist skin diseases. Anodyne lotions relieve heat and pain in inflammation; and inflamed eyes are treated with cool or slightly astringent lotions.

When the fluid is used for rubbing on the part, it is called a *liniment* or *embrocation*. These are very extensively employed in veterinary medicine for chronic swellings, painful

joints and muscles, for dispersing tumors, and stimulating internal organs.

Poultices are soft and moist applications, intended to soothe, soften and relax the surfaces to which they are applied. They may be cold or hot, and may be either plain or medicated. Hot poultices are commonly made of linseed meal, bran or hot mush, with a sufficiency of boiling water to bring them to a suitable consistence. Hot poultices encourage suppuration and should not be applied to fresh wounds.

Cold poultices are made in the same way as hot poultices, and allowed to grow cold.

Powders are generally mixed with the animal's food or stirred in gruel or soft feed. But unless agreeable to the taste they will be refused in this form. When small in quantity they may be dropped on the tongue. Most remedies can be obtained in this form, and it is for tasteless or pleasant ones the most convenient form in which to administer them. Their effect is as a rule not so prompt as when given in solution.

Drenches, Drafts or Drinks. All varieties of liquid medicines may be administered by these methods. When tasteless or palateable to the animal they may be mixed with its ordinary beverage, water or milk, as the case may be. When such is not the case they must be poured down the throat, constituting what farmers call *a drench.*

The quantity so administered at a time should not be too great; for a horse, one to two pints, for an ox, one to two quarts, for a sheep or pig half a pint, are the proper amounts. The instrument often used is a strong glass bottle; but one made of block tin, and flattened, is safer.

Best of all is the old-fashioned *drenching-horn*, when one has had a little practice with it, and knows how to manage it. The most desirable shape is one in which the point of the horn turns downward, while the large end has an oblique opening turned in the upward direction, as in this figure:

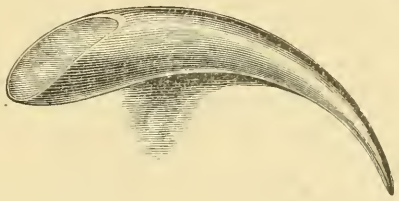

FIG. 6.—THE BEST SHAPE OF A DRENCHING HORN.

Drenches ought always to be thoroughly mixed and well-shaken before being given, and if a violent fit of coughing comes on during their administration, they should be suspended and the animal set free for a few minutes.

We shall now proceed to give special directions for drenching various animals, adopting as our guide that able veterinarian, Prof. John Gamgee.

RULES FOR DRENCHING A HORSE.

As regards the process of exhibiting a drench to a horse, it is not always well understood; and hence serious and fatal consequences have resulted from the exhibition of remedies in the liquid form.

The rules to observe are:

First, Hold the horse's head up at a moderate height, so that the line of the face is horizontal.

Secondly, Secure the tongue to prevent the lapping out of the liquid, but allow of sufficient movement of lips, tongue, cheeks, and jaws, so as not to interfere with the first act of swallowing. To draw the tongue forcibly outwards is very

injudicious, as if the tongue be stretched it does not aid in pressing back the fluid, which gravitates as the tongue is pulled upon, and the larynx and pharynx advance;—the animal may thus be choked.

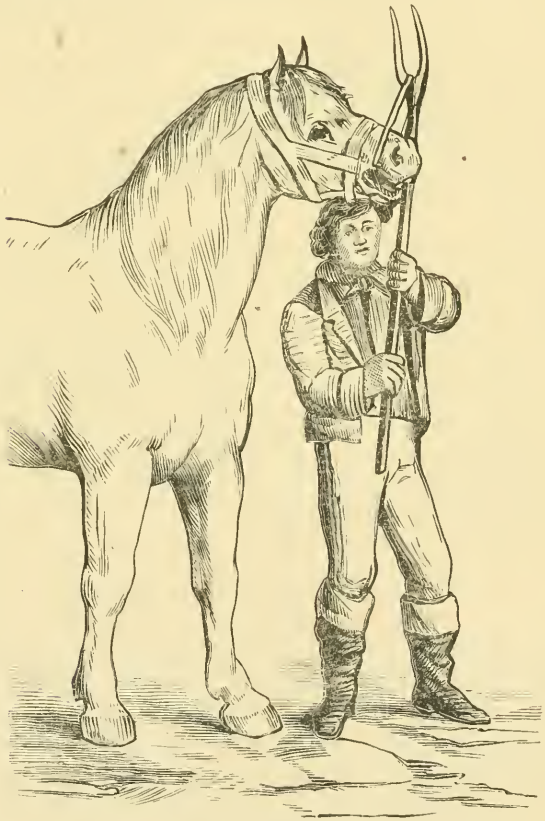

FIG. 7.—HOLDING A HORSE FOR DRENCHING.

Thirdly, If an animal makes an effort to cough, rather lose the draught than risk the danger of choking, which so readily occurs if fluid be suddenly thrown over the tongue.

Fourthly, Entice efforts of swallowing, should the horse

obstinately and artfully retain the liquid in his mouth. This is effected by rubbing the throat, and exerting pressure in the space between the lower jaw bones.

The methods of holding horses during the exhibition of a draught are various, but the most important ones are three. In the first place, by ropes and pulleys a horse's head is pulled up from a beam or other high object in a stable or shed. This is very objectionable, especially in a vicious horse; and it does not answer better than the second manner of introducing a rope noose over the upper jaw. This noose is attached to a stick, or slipped over a stable-fork prong (see Fig. 7); and a man can then hold up the head of the heaviest horse and follow him in his movements. It requires management.

In Fig. 8 the third manner of holding a horse's head up and exhibiting a drench is represented. It is the most simple and useful method. It only requires one person, who holds the tongue, places his thumb round the lower jaw, and with his fingers causes the horse to open his mouth whilst the draught is poured out of the horn with the right hand.

In cases of lock-jaw or tetanus, it is difficult to exhibit even fluid medicines to horses. There are two useful methods, however, to accomplish this. The first is by the introduction of a tube into the gullet through the mouth; and the second is by pouring or pumping the fluid through the nose. The objections to the latter procedure are not so weighty as at first sight may appear, provided the fluid is a perfect solution, and poured down the inferior or posterior channel of the nostril with care.

RULES FOR GIVING DRENCHES TO THE OX.

The horn should always be used. The manner of holding the horn, of securing the animal, and giving the drench, is clearly represented in Fig. 9.

The chief points to attend to are—(*a*) not to irritate the animal; (*b*) always to attempt the operation from the right side; (*c*) seize hold of the upper jaw by passing the left hand over the head; and bend the latter far round to the right;

FIG. 8.—HOLDING A HORSE FOR DRENCHING.

this simple contrivance very effectually tames or disarms even a vicious bull, ox, or cow; (*d*) the operator should stand well with his back against the animal's shoulder, propping him-

self up with the right leg; to do this the animal should, especially if awkward, be against a wall on its left side. An incautious person may be severely bruised and thrown into the manger by proceeding up to the head of a cow, not getting full command of the animal, and presenting his back to

FIG. 9.—DRENCHING AN OX.

its hind extremities, with which an ox can strike effectually forwards.

Sometimes the organs of swallowing are paralysed in cattle, as in cases of parturient apoplexy; at other times there are foreign substances impacted in the gullet. With the

view of displacing the foreign object in the one instance, and of introducing medicines in the fluid state in the stomach under any emergency, a hollow probang may be used. The fluids may also be forced into the stomach by the pumping action of a syringe.

The probang is guided through the centre of the mouth by a gag. We give the drawing of two forms. Fig. 9 is probably the best.

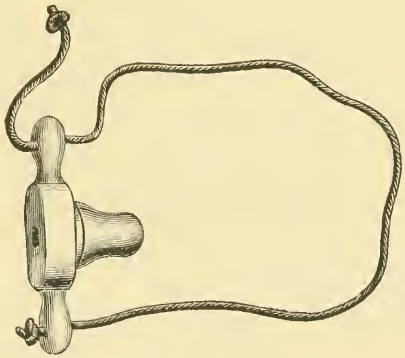

FIG. 10.—AN OX GAG.

The advantage it has over the common gag is, that it is tied by a rope to the mouth, and then, in virtue of its shape, it is a more complete guide to the probang than the instrument represented at Fig. 10. The latter is the common gag, to be held in the animal's mouth by an assistant, whilst the operator uses the probang.

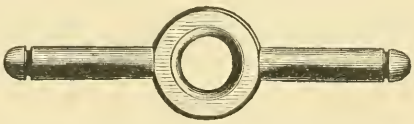

FIG. 11.—AN OX GAG.

As the first stomach of ruminants is very capacious and lies flat against the left side of the belly, an expedient has

been adopted of puncturing the stomach to evacuate it, or to introduce into it medicinal agents. The stomach is punctured by trochars, such as are represented by Figs. 12 and 12. The first has a cylindrical *canula* and *stilet,* the canula being somewhat less than a third of an inch in diameter, and three and a-half inches in length. The one represented by Fig. 13 is flattened, and the canula half-an-inch in its greatest width, and four and a-half inches in length.

FIG. 12.—A TROCHAR.

FIG. 13.—A TROCHAR.

These trochars are used in the following manner:—A spot is chosen midway between the last rib and the lower part of the haunch bone, and about eight or nine inches below the bony knobs of the backbone of the cow; a small incision is made through the skin with a lancet or bistoury, and then the trochar is pushed with sufficient force and impulse at once to penetrate the walls of the belly and rumen.

INJECTION OF FLUIDS INTO THE NOSE.

Fluids are sometimes poured into the nose that they may be swallowed; but usually the internal exhibition of remedies by the nose is effected by means of a stomach-pump, with a long flexible tuble. The practice is an objectionable one, but may, under certain circumstances, be absolutely indispensable.

The introduction of liquids into the nostrils to exert a

curative influence on its lining membrane is a more common practice, and attended with much good. The old method of performing this operation is simply to use a syringe, or to elevate the head and pour lotions, etc., into the nose.

Professor Rey has adopted a very simple and satisfactory procedure. It consists in causing the fluid to rise in each nostril by atmospheric pressure, and when the one division of the nose is thus filled, the liquid passes over, and is seen to flow out at the opposite nostril. In this way the liquid most effectually touches every part of the membrane, and a mild solution of sulphate of zinc or copper, and other sedative, astringent, or antiseptic lotion, may be brought in contact with the suppurating or ulcered surface. The instrument which Professor Rey employs for this purpose is drawn at Fig. 14. The long tube is fifteen inches in length, and one and a-half inches in diameter, expanding and funnel-shaped above, where the broadest part is two inches wide.

FIG. 14.—TUBE FOR WASHING THE NOSTRILS.

The short arm is five inches in length, and the aperture two-thirds of an inch in diameter. Over the short arm is passed a closely-fitting leather ring, four and a-half inches in diameter. This serves as the surface over which, and round the short arm, wet tow may be adapted, so that, on introducing the small tube in the nostril, the latter is compressed carefully on the tow; at the same time fluid is poured into the funnel, and rises in the nasal chamber. If the horse's head be bent in, and held as much as possible in a perpen-

dicular position, the lotion will pass out at the opposite nostril. We sometimes have a little difficulty in performing this maneuvre with awkward horses, but by quiet means they are soon accustomed to the operation. Some persons advocate twitching; occasionally the ear may be twitched; the animals sometimes require to be blindfolded, but at others it is best to let them see what is being done; and most frequently not the slightest trouble attends the injection. It is an invaluable method of using remedies in the treatment of diseases of the nose.

Fomentations are applied by wrapping the part to be treated in flannel bandages or horse cloths, and keeping these wrappings constantly wet with the liquid employed. This may be simple water, cold or hot, or mixed with vinegar, laudanum, an antiseptic, or any other appropriate remedy. The wrap should be covered with a layer of rubber cloth or oil cloth to retain the moisture. For small surfaces, a sponge or a soft piece of rag, tow, lint or oakum is appropriate.

They are usually applied to cleanse and soothe irritable wounds; to relieve external or superficial inflammation; and to reduce internal inflammation as in pleurisy, pneumonia or acute kidney disease. In ordinary use they are apt to be withdrawn before they have done much good. To obtain their full benefits they should be continued several hours, fresh supplies of the liquid being added as often as the temperature of the cloths fall or they begin to dry.

A very serviceable and convenient method of fomenting is to take a sheep-skin with plenty of wool on it, wring it out in hot water and apply it to the part. After the operation is finished, the parts should be rubbed dry and well clothed, in order to prevent the rapid fall of temperature and consequent chill, which otherwise is liable to occur. As

a further means of guarding against this, the fomented surfaces may have a light dressing of mustard rubbed into them.

Ointments are prepared by mixing the drug to be used with lard, butter, or cerate, or what is far better, the petroleum product called petroleum ointment, cosmoline or vaseline. This substance never becomes rancid, has no unpleasant odor, and by adding wax or parafine can be made of any desired thickness. Ointments are of especial use in diseases of the skin and hair, though as their ingredients can be absorbed by the skin, they are sometimes employed to introduce medicines into the system.

Plasters are solid adhesive substances usually containing litharge, with resin, wax, soap, tar or pitch. They are not very useful in veterinary practice, and when employed it is usually in the form of *charges*. These are where the ingredients of the plaster are melted or poured directly on the skin. They are then covered with ravelled tow or lint, and confined by a linen or leathern bandage. In former times this was a popular practice with farriers, but has gone somewhat out of date.

They are well adapted as a dressing to slow inflammations, particular of the joints, ligaments, tendons or feet. They are even more useful in joint affections in cattle than in horses, and sometimes benefit such cases when other means have failed. They are, however, often difficult to apply and keep upon the part, and for this reason can generally be superseded by water dressings, lotions and fomentations.

WEIGHTS AND MEASURES.

The weights and measures used by veterinarians are the apothecaries' weight and wine measure.

APOTHECARIES' WEIGHT.

60 grains	=	1 drachm.
8 drachms	=	1 ounce.
16 ounces	=	1 pound.

WINE MEASURE.

60 drops	=	1 drachm.
8 drachms	=	1 ounce.
16 ounces	=	1 pint.
8 pints	=	1 gallon.

For nearly all practical purposes, quantities of fluids may be measured in familiar domestic utensils to correspond to the above table, as follows:

60 drops	= 1 teaspoonful	= 1 drachm.
4 teaspoonfuls	= 1 tablespoonful	= ½ ounce.
2 tablespoonfuls		= 1 ounce.
1 wineglassful		= 2 ounces.
1 teacupful		= 4 ounces.
1 tumblerful		= ½ pint.
1 tincupful		= 1 pint.

As a familiar manner of estimating weights in dry measure, we may say

A handful of linseed, aniseed, etc.	=	2 ounces.
" dried leaves	=	1 ounce.
A hen's egg	=	2 ounces.
Three silver half-dollars	=	1 ounce.

By the use of these familiar standards, it will nearly always be practicable to obtain all the accuracy needed in giving medicine to the lower animals.

CHAPTER IV.

VETERINARY SURGICAL INSTRUMENTS AND MINOR SURGICAL OPERATIONS.

The Veterinary Pocket Case and its Contents—Preparations for Operating—Bleeding—Setons—Firing—Sutures—Operations on the Teeth—Blistering.

Every stock owner who would qualify himself to take proper care of the animals he possesses, should provide himself with a small pocket case of veterinary surgical instruments, which he should keep always sharp and clean, and use for their intended purpose, *and no other*. What such a case should contain, and the uses of each instrument, we shall now explain. In doing so, we shall preface it with the remark that our endeavor will be to mention only the most important instruments, and those in the use of which any intelligent man can qualify himself by a very moderate practice on dead animals—a form of education we earnestly recommend.

We have taken some pains to select, with the aid of the advice of practical men in this department, a "Stock Owner's Pocket Veterinary Case", which is represented in the cut on the following page. It contains nine different instruments, sufficient in number and variety for nearly all the lesser operations which an intelligent owner, not a professed surgeon, would be called upon to perform. The instruments and their uses are as follows:

1. A *blunt pointed bistoury*, slightly curved, for operations under the skin, in cavities, etc.

2. A *thumb lancet*. This form is safer than the ordinary spring lancet, and much superior to the old-fashioned *fleam*,

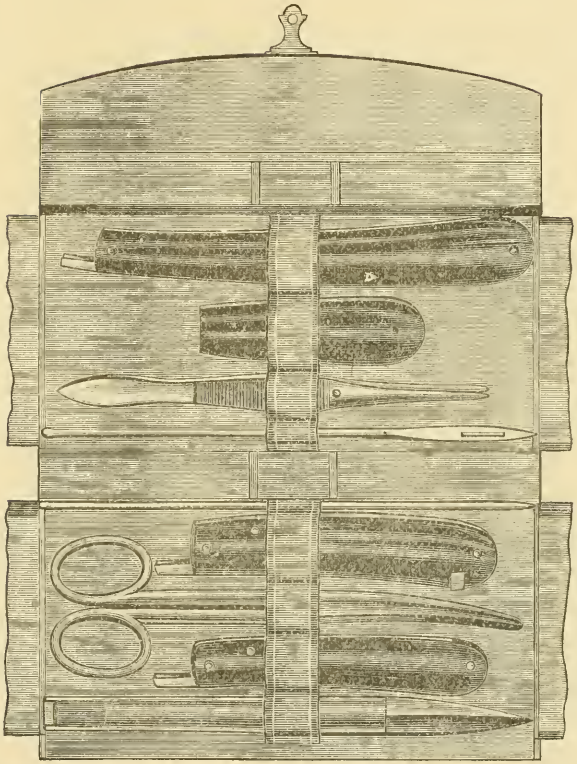

FIG. 15.—STOCK OWNER'S POCKET VETERINARY CASE.

The above cut represents a convenient pocket case of Morocco or Russia leather, containing the instruments most essential in the performance of minor surgical operations on animals. The case is represented unfolded, and the instruments are displayed in the following order, from above downwards:

A blunt pointed bistoury.
A thumb lancet.
A spring forceps.
An aneurism needle.
A silver probe.
A frog knife.
A curved scissors.
A bistoury.
A seton needle.

now almost obsolete. The exact depth and length of the cut can best be judged by the ordinary thumb lancet.

3. A pair of *forceps*, for dressing wounds, catching arteries for tying, removing foreign bodies, etc.

4. A long blunt pointed needle, called an *aneurismal needle*, which can be used as a probe, and for small setons, etc.

5. A silver *probe*, blunt at one end, sharp at the other for exploring wounds.

6. A *frog knife*, having a narrow straight blade, curved into a strong sharp hook at the end; very useful in cleaning hoofs, etc.

7. A pair of *curved scissors*, for trimming the edges of wounds, cutting hair, etc.

8. A straight broad *scalpel*, for opening abscesses, castrating, etc.

9. A *seton needle*, for introducing tapes, etc. In addition to these the case contains half a dozen surgical needles and thread, and two inside pockets for paper,etc.

Such a set of instruments, made in the best manner and furnished in a neat and durable morocco case, should be bought for ten dollars; and in order that they may be obtained of good quality and with little trouble, we have arranged with the publishers of this work that they shall supply them at the above price, when requested.

PREPARATIONS FOR OPERATING.

Fastening the Animal.—In performing operations on animals, it is of the first importance, both for the safety of the operator and the successful achievement of his task, that the patient be firmly secured.

Usually this can conveniently be done by "casting" or throwing the animal by means of a hobble attached to all four feet, which are then drawn rapidly together by assist-

ants, and the horse pushed over on his side. A single limb can then be loosened and held by a strap around the fetlock in the hands of a reliable man, while another sits on the horse's head.

The arrangement called the "trevis" or "break" is a narrow pen, six feet long and three wide, with stout corner posts and side rails on both sides and one end. The horse is led into it at the open end, which is then closed with a bar. His legs are fastened to each post by broad leather straps; and he may be suspended to the side pieces by a stout band under the belly. In this position, with his head secured, he can neither bite nor kick.

Anæsthetics.—In most painful operations, when not about the mouth (where the flow of blood might strangulate an unconscious animal), it is a humane procedure to chloroform the animal. Horses have generally to be cast before the inhalation can be affected. The chloroform should be poured on a sponge, a teaspoonful or two at a time, and held to the nostrils, not, however, continuously, as the vapor of chloroform undiluted with atmospheric air is a fatal poison. The animal should be closely watched, and as soon as unconsciousness is produced the anæsthetic should be suspended, and renewed from time to time until the operation is complete.

Nausea and depression continue usually for some hours afterwards. Should the pulse fail, and the respiration grow shallow and irregular, buckets of cold water must be dashed on the body, and artificial respiration be continued for a time by blowing gently with a pair of bellows into the mouth or nostrils, and alternately pressing upon and releasing the ribs, thus imitating the natural acts of respiration. Pieces of ice inserted into the rectum or vagina act also as powerful restoratives.

Many practitioners use the chloroform pure, and thus em-

ployed its effects are more rapid ; but they are also more dangerous. For that reason we recommend the following anæsthetic mixture in preference, which comes endorsed by high authority after extensive employment :

No. 12.	Alcohol,	1 oz.
	Chloroform,	2 oz.
	Ether,	3 oz.

Shake the bottle well on using it.

This will be found effective with all sorts of animals, and requires but two or three minutes to overpower with safety the struggles of the strongest horse or ox.

BLEEDING.

So much has been said of late years on the abuse of bleeding, that we might suppose that sound ideas on the subject had penetrated as far as the brain of the ordinary farrier. But we have strong grounds for the belief that this is not the case, and throughout the States it is a very common practice to bleed in diseases of stock far more than there is any reason or safety in doing.

There are cases where prompt and bold bleeding is by common consent the only chance for life, as we shall see in the later pages of this book, so the lancet should still be in every veterinary case, ready for immediate use.

In the horse and ox, the jugular vein, which runs prominently up the side of the neck, is the one usually chosen from which to draw blood. The blood-vessels of the palate or roof of the mouth are chosen by some, especially in staggers and brain diseases. If the jugular is pressed upon by the finger, a little below the spot selected for the incision, it will in a few moments become distended and prominent. The horse should be blindfolded and a thumb lancet used.

The quantity of blood taken depends upon the object in view, but to make any decided impression on an adult animal of either species, at least six or seven quarts should be drawn.

When the flow has ceased the two lips of the wound are raised between the fingers, a small common pin run through them and some thread twisted across and over it, to keep it in place.

In the sheep, bleeding from the jugular vein is also most efficient. But some veterinarians prefer the angular or cheek vein. This is to be found in the cheek, at a spot equidistant from the eye and the mouth, just below the bony tubercle which marks the insertion of the fourth tooth into the upper jaw. The incision should be made from below upwards, half an inch below the middle of the tubercle. Others again prefer the eye vein. To divide this the point of a knife is inserted near the lower extremity of the pouch below the eye; the point is pressed downward and a cut made inward toward the middle of the face.

In swine, bleeding is usually performed in an off-hand way, by cutting off the end of the ear or the tail. Pigs are such unmanageable patients, that it is both difficult and dangerous to attempt refinements of treatment with them. When practicable, however, it is neater to turn the ear back and by pressing firmly on its base with the thumb, to bring into prominence some of the veins, which may then be cut across. Or a cord can be tied tightly around the fore leg above the knee, when the brachial vein will be seen to fill up, and can readily be lanced. This vein is on the inside of the leg, and should be opened about an inch above the knee.

SETONS.

These are tapes, fine wires or threads, which are passed underneath the skin, entering at one point and emerging at

another, the ends knotted together to prevent dropping out. They are usually smeared with an irritant salve, and turned every day or two, so as to keep up a constant irritation and discharge from the part. The seton needle used for their introduction is about six inches long.

They act very satisfactorily in some cases of bone disease, but where the lameness is owing to strained sinews or ligaments they are out of place, as they leave additional thickening. They are also valuable in healing old fistulas, being inserted the whole length of the canal, and setting up a new and healthy inflammation in its sides. As appropriate ointments, the following are recommended for smearing the seton:

No. 13.	Powdered cantharides,	1 part.
	Oil of turpentine,	
	Canada Balsam, of each,	8 parts.

Digest the cantharides and turpentine together and add the balsam.

No. 14.	Powdered white hellebore,	1 part.
	Lard,	8 parts.

Mix at a gentle heat.

No. 15.	Citrine ointment,	3 parts.
	Oil of turpentine,	1 part.

Mix.

Or either of the ingredients in this last formula alone will answer very well.

FIRING.

The hot iron or the actual cautery is a very useful agent in veterinary practice, and should not be dispensed with or condemned on mistaken notions of tenderness. In certain diseases it cannot be successfully replaced by any other form of counter irritation. It must of course be used with discretion, but any one with experience must have seen it remove pain very rapidly when blisters, etc., have failed to do so. In bone diseases and in many cases of chronic lameness, it is of great benefit.

The iron should be used at a full red or white heat, and the part touched as lightly as possible, so that a distinct impression is made. More than one leg should not be fired at one time.

Various forms of cauteries or "firing irons" are used. Those with a narrow edge, about as thick as a dime, so that the firing may be performed in parallel lines across the limbs are preferable, as leaving the least blemish. The same may be said in favor of Prof. Williams' iron for "pyro-puncture," which leaves hardly any blemish, and makes a deep impression on the structure. It is represented in the following engraving:—

FIG. 16.—PROF. WILLIAMS' IRON FOR "PYRO-PUNCTURE."

As in blistering, the hair should be closely shaved before the iron is applied; and the operator is wise to convince himself that the animal is securely fastened before the procedure begins.

On the day after the firing, the part should be smeared with neat's foot or other bland oil, and this repeated daily until the swelling subsides. A rest of several months is advised after the operation, as if the animal is put to work too soon the disease will most probably return, and the pain have been needless.

A method of firing is adopted by some veterinarians which obviates the objections made to the process, and is often very effective. It is based on the fact that the boiling point of fat is about three times that of boiling water, and that by applying boiling fat to the part at a temperature of say 600°

Fahrenheit, a powerful impression is made on the vessels without blemishing.

A flat or slightly hollowed iron is heated to a dull red heat. A piece of bacon rind with a little of the fat attached to it, is then placed on the spavin or tumor which is to be dispersed. The iron is then applied upon the bacon rind, and firmly held there for the space of two or three minutes, and afterwards more lightly applied, until the rind is dried or burned. This may be repeated several times at intervals of two or three days, and it will be found to exercise a potent, stimulating influence, and leave no scar.

SUTURES OR STITCHES.

When the edges of a wound or incision are properly cleansed and the bleeding checked, they are brought together and maintained in their proper and natural position by stitches or sutures. Of these there are two varieties which are principally used in domestic veterinary surgery. They are known as the "interrupted suture" and the "twisted suture."

1. The *interrupted suture* is one in which the needle is carried through the two edges of the wound, and the thread

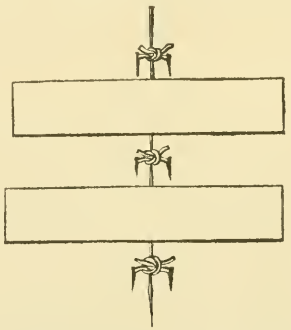

FIG. 17.—THE INTERRUPTED SUTURE.

then cut, leaving an end about three inches long on each side of the cut. These are then brought together and tied, and the ends cut off close to the wound, as illustrated in Fig. 17.

2. In the *twisted suture* a needle is not used, but a strong pin is run through each edge of the cut, and a thread or fine wire is twisted across the two protruding ends of the pin, so that the edges of the wound are firmly held in place; as seen in Fig. 18.

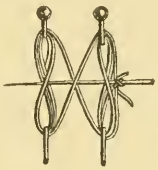

FIG. 18.—THE TWISTED SUTURE.

After a wound is closed with sutures, it should be dressed with a plaster, ointment or a bandage, so as to prevent the thread or pins from tearing out; and it is proper to remove them in four or five days, to prevent blemishing.

OPERATIONS ON THE TEETH.

The teeth of horses require frequent attention at the hands of the veterinarian or of the owner, if he would keep his animals in good condition.

If the lower incisors become so long as to bruise, or otherwise injure the bars or roof of the mouth, they must be shortened with a rasp.

The same instrument is required when it is found that owing to the greater width of the upper row of the molars, a ridge of unworn tooth material is presented on the outer aspect of the upper, and on the inner side of the lower teeth, leading the horse to wound his tongue in masticating, and to grind his food.

If through irregularity of the teeth some become more prominent than others, they must be filed down; and as always when a tooth in one jaw is lost, its fellow in the other jaw tends to grow too long, the rasp is required to file it back from time to time.

Extraction of the teeth is required in case of decay. This change is confined to the grinders or molar teeth. The first, second, and third molars may be withdrawn by the forceps; but the fourth, fifth, and sixth have to be removed by "punching" after trephining the gum. The operation is as follows, and can easily be learned by a little practice on the dead animal:

Cast the horse and trephine the gum so as to make the opening to correspond to the fang of the diseased tooth, allowing sufficient space above or below the diseased fang—*above*, if the operation be in the upper, *below*, if it be on the bottom jaw—for the introduction of the punch. The punch should be at least an inch in circumference at its point, that it may not cut or split the tooth.

Two or three smart but not heavy blows with the hammer will be sufficient to loosen the tooth; and it may then be removed with the forceps or the hand. The cavity should be washed out with a solution of alum, or some carbolic acid water. The cavity will in a few weeks close over.

BLISTERING.

The application of a blister is a part of the routine treatment of the common veterinarian whenever he suspects internal inflammation. It is a pernicious and discreditable practice. Blisters usually do no good whatever in deep seated inflammations, and they not only leave a blemish slow to disappear, but they cause the animal a great deal of severe pain and have often brought on strangling and irritation of the bladder.

Blisters should be confined to cases where the acute, inflammatory symptoms have passed away, and where it is desired to cause the absorption of some deposit, or to stimulate the vessels to effect some organic change, as to hasten the opening of an abscess, or the reduction of an enlarged gland.

Before a blister is applied the hair should be cut from the part, which should then be washed and dried, and the blistering fluid applied with smart friction for several minutes. The blistering ointment preferred by the Edinburgh Veterinary College is the following:

No. 16.	Powdered cantharides,	1 part.
	Lard heated to 212°,	12 parts.

Mix well together and cool.

At this strength, the ointment if thoroughly applied will raise a good blister and will *never blemish.*

Most of the ointments are very much stronger than this. That recommended by Mr. Youatt was,

No. 17.	Powdered cantharides,	
	Powdered resin, each	1 oz.
	Lard,	4 oz.

Melt the lard and resin together and stir in the flies.

Another of medium strength is,

No. 18.	Powdered cantharides,	1 oz.
	Lard or oil,	6 oz.

Melt together.

The addition of turpentine, sulphuric acid, arsenic, corrosive sublimate and the like, should be avoided. They serve no useful purpose, and merely increase the pain needlessly.

Blistering plasters are not used in veterinary surgery, but there are preparations called "sweating blisters" popular

with some. They are of strong tincture of cantharides made as follows:

No. 19.	Powdered flies,	1 oz.
	Alcohol,	1 pint.

Steep for two weeks.

This is of medium strength, and can be increased in its action by adding a few ounces of solution of ammonia or oil of turpentine. These tinctures rarely raise a full blister, but cause considerble irritation and a watery discharge. In using them it is not essential that the hair be removed; and they may be applied repeatedly to the same spot without blemishing.

Blisters are not much used on cattle, as on them sufficient irritation can generally be produced by mustard and hot water, well rubbed in.

A blister while rising causes much irritation, and the animal will always try to rub or bite the blistered part. In the horse this should be prevented by tying the head to the rack, or tying up the tail. On the second day after it has been applied, the part should be fomented with warm water, and dressed with lard, oil or any simple ointment.

Sometimes it is desirable to maintain the effect of the blister for some time. This is to be accomplished by dressing the part with some more of the blistering ointment diluted to one-half or one-fourth its strength with lard or oil.

The following general rules should be observed:

1. Do not blister more than two spots at one time.
2. Do not blister much in hot weather.
3. Always be on your guard against producing strangury, which is easily brought on in some horses.
4. Never blister a highly inflamed part, nor where there are signs of erysipelas or mortification.

If the blister causes excessive nervous irritability, loss of appetite, or difficulty in watering, wash the blistered surface with warm water containing soft soap; dress it with sweet oil; and give the animal a full dose of opium.

ROWELS OR ISSUES.

A rowel or issue consists in a wound made in the skin with a bistoury or rowel scissors, and kept open by a pledget of tow, lint, or leather, which to increase the counter irritation and discharge, is sometimes smeared with irritant dressing. Its actions are similar to that of a seton. The more cultivated veterinary surgeons employ rowels much less than their predecessors; indeed, it may be said that they are a form of counter irritation which is passing out of fashion, and justly so. They will be rarely recommended in the present work.

CHAPTER V.

GENERAL RULES FOR RECOGNISING AND DISTINGUISHING DISEASES.

The Pulse—The Breathing—The Animal Heat—The Skin and Hair—The Posture—Indications of Pain—Special Signs in Cattle—Signs of Diseases of Particular Organs.

Any one who would become expert in recognizing diseases in animals, must study them carefully in the healthy state, and make himself thoroughly familiar with their habits, appearance and general physiology. He must practice feeling their pulse and the heart, listening to the sounds of their

lungs in breathing, and taking their temperature, by feeling the skin and also by using a properly constructed thermometer. He should watch the appearances of the eye and tongue, and note the positions assumed when asleep and awake. He should observe the character and frequency of the discharges of the bowels and bladder, and the eagerness of their appetite. For it is in the variations from health in these particulars, that the veterinarian discovers the guides which lead him to the recognition of the particular disease he has to treat. We shall examine each of these items separately, and assure our readers that if they will verify our statements by practice on the living animals, they will soon be in a position to take charge of them when sick, quite as well and often a great deal better than the average farrier, as he is to be found in this country.

THE PULSE.

The Pulse differs very much in the domestic animals. In the full grown horse at rest, its beats are about 40 per minute; in the ox, from 50 to 55; and in the sheep and pig, about as in man, that is, averaging 70 to 80 beats in the minute. In calves and colts, and in animals well advanced in years, the pulse increases in health, to about twice these figures; and it is also increased by hot, close stables, full feeding, and the condition of pregnancy.

The pulse may be felt wherever a considerable artery passes over a bone. It is usually examined in the horse on the cord which runs across the bone of the lower jaw, just in front of its curved portion; or on the bony ridge which extends upward from the eye; or inside the elbow. In cattle, it is conveniently reached over the middle of the first rib, or beneath the tail. There is a marked difference of force in the pulse of the two species; that of the horse being

full and rather tense, while in the ox, it is soft and rolling.

When the pulse differs materially from these conditions in any direction, it is a sign of disease. If rapid, full and hard, there is high fever or acute inflammation; if rapid, small and weak, there is low fever, loss of blood or weakness. If very slow, we may suspect brain disease; if irregular, now fast and in a few seconds slow, we should look for a diseased condition of the heart.

In the sheep, the pulse is felt by placing the hand on the left side, where the beatings of the heart can be felt; or at about the middle of the inside of the thigh, where the femoral artery passes obliquely across the bone.

THE BREATHING.

The Breathing is next in importance. If the ear is applied to the throat of a healthy horse or ox, the air will be heard passing through the windpipe with a regular, steady blowing sound; if applied to the chest, a soft rustling murmur will be heard, like a gentle breeze in the tree tops, caused by the air passing in and out of the fine tubes and vessels of the lungs. But where the lung or throat is diseased, these sounds are very much changed and in many directions, which it is not necessary to dwell on here, but which will at once indicate the presence of something amiss with these important organs.

If the fore finger of the left hand is placed firmly on the chest and smartly tapped with the ends of the three first fingers of the right hand, the sound will be noticed to be much more resonant and clear than when the same procedure is practiced on the solid thigh. This is because the lungs are not solid, but are always in health well expanded with air. But in various diseases, as pneumonia and pleurisy, they fill up with fluid and become solid, and then the sound

given out, by thus *percussing* them as it is called, is like that on any other solid part of the animals. Hence this is another very important indication of disease.

By practice on healthy animals, the character and boundaries of these sounds can be learned so closely, that any variation from them will be at once detected, and will sometimes reveal the presence of an unsound condition, when no other means will.

The rapidity with which the act of breathing is performed can easily be counted by the heaving of the chest. In health, in the adult horse at rest, it is from eight to twelve times a minute, and in the ox a little faster. Any great increase, without obvious cause, is a positive sign of a diseased condition.

THE ANIMAL HEAT.

The temperature of animals can be ascertained, to a slight extent, by the feel of the skin, the ears, and the legs. A hot, dry skin in a horse generally accompanies a feverish condition. Cold ears and legs are a sign of serious disease. But the only scientific, that is, accurate plan, is to use what is called a "clinical thermometer," that is, one, the bulb of which can be bared and inserted into the rectum. After it has remained there two or three minutes, the mercury will accurately indicate the temperature of the blood. This in health is 98°, and any deviation from this, even of a few degrees, is a certain sign of disease. Those veterinarians who have practiced sufficiently with this instrument to become skilled in its use, declare it invaluable in their business, as affording them grounds for opinions about diseases which no other symptoms could.

Thus it has been found that every disease has its own degree, a temperature at which it is either favorable or fatal. For example, if in that sometimes prevalent epidemic among horses, cerebro-spinal meningitis, the thermometer rises as high

as 104°, it is a certain indication that the horse will shortly die; while in such a disease as inflammation of the lungs, the mercury will register 108° or 109°, and the horse recover. If in gastric or typhoid fever the heat has been 103°, and falls to 100°, and then suddenly rises again to its previous figure, the chances are terribly against the patient, no matter what the other appearances may seem to say. These few examples will serve to show how valuable the instrument may become in the hands of an intelligent person.

THE SKIN AND HAIR.

The skin in its general feeling and appearance is an important guide to the condition of an animal. A dry, scurfy appearance is a symptom of indigestion, and liability to joint affections. What is called "hide-bound" is a symptom of a general state of poor nutrition, arising from indigestion, improper food, worms, or a want of proper exercise. The skin feels stretched and hard, as if too small for the body. The condition known as "staring coat," when the hairs stand out like bristles, is often the only symptom of a low state of health. Whenever an animal is disposed to shiver, with shedding of the coat, when exposed to moderate cold, or without such exposure, it is on the edge of some disease. A persistently staring coat, without other symptoms of disease, often indicates the approach of an attack of farcy or glanders, and when with this are repeated shivers or chills, we may expect the strangles, weed, or other diseases with suppuration. When in an attack of disease the skin becomes covered with a cold sweat, the life of the animal is in great danger.

THE POSTURE.

The position of an animal, its mode of standing and lying down, are all significant. Lying persistently on one side, or

obstinately maintaining one position, shows that any other is painful. Horses stand as long as they possibly can, as they breathe much easier in the upright position, and if they once lie down, they soon despair and die. Hence the rule is with a horse to sling him up, in almost all ailments. With cattle it is different, and it is much less important to keep them erect. When animals cannot rise, it may be from weakness, or from palsied limbs, or from severe injuries or sprains.

INDICATIONS OF PAIN.

The feeling of pain in animals is indicated by their flinching when the painful part is touched; by the care which they take in lying down, walking or standing to "favor" the part, and by the appearance of the eye. Distress and suffering are generally plainly apparent in the faces of sick horses and cattle.

SPECIAL SIGNS IN CATTLE.

In cattle the *horn* at its root yields by the sensation it imparts to the hand a rough idea of the temperature of the blood, and the cowleech generally feels it as the doctor does the pulse, as a part of the indispensable programme of a professional visit. If the temperature is natural, he concludes there is no fever; if cold, and the tips of the ears also cold, it is a sign of some serious internal congestion, the blood no longer circulating in natural force through the extremities.

The *muzzle* is another part he takes note of. In health this is moist, covered with "dew," as the saying is; but in disease, especially fever, it is dry, hotter or colder than natural, and sometimes changed in color, paler or injected with blood. By looking at the flanks, the regularity of the respiration is noted, rapid and irregular heaving there betraying the disturbance of the important function of breathing. In

ruminants also, the second mastication of the food is among the first of the vital processes to become disturbed in disease. When a cow or an ox "loses the cud," as it is called by herdmen, that is, ceases to ruminate without apparent cause, there is sure to be a feeling of sickness about the animal which is thus interfering with one of its processes of digestion.

THE SIGNS OF DISEASES OF PARTICULAR ORGANS.

There are various plans of classifying diseases, but the one most practically useful is to arrange them with reference to the main organs affected, because by following this plan they are most easily recognized. Hence we have "Local Diseases" that are principally located in one or another part of the body, and "General Diseases," which affect all of it. But it must not be forgotten that local diseases, as they increase in severity, generally involve the whole system more or less; and that general diseases may have local signs.

By a careful study of what follows, the reader will be able generally to determine with accuracy the seat of disease.

Local diseases include

1. Diseases of the brain, spinal cord and nerves.
2. Diseases of the breathing organs (windpipe and lungs).
3. Diseases of the digestive organs (mouth, throat, stomach, bowels).
4. Diseases of the heart and blood-vessels.
5. Diseases of the kidneys, bladder and sex organs.

The prominent signs by which they can be recognized are as follows:—

1. *Signs of Diseases of the Brain, Spinal Cord and Nerves.*

When there is unusual dullness and sleepiness, or their opposite, wakefulness and wildness, brain disease may be sus-

pected. Palsy, spasms and convulsions point in the same direction. A prominent and swollen condition of both eyes occurs in congestion of the brain; and a projection of the haw (the winking membrane of the eye) is a sure sign of lockjaw. Snoring or stertorous breathing is a pretty sure symptom of brain disease.

2. *Signs of Diseases of the Breathing Organs.*

Here *cough* is the most important symptom. It is *moist* in catarrh, colds, and other diseases where there is a discharge from the lining membranes of the air passages; and *dry* in the first stages of colds, in pleurisy, broken wind, roaring, and when, as occasionally happens, it does not depend on disease of the breathing organs, but is, as it is called, *sympathetic* of other complaints, especially indigestion, worms, and liver disease.

Rapid, irregular, or difficult breathing is present in most affections of the lungs; and when the motion of breathing is more visible than usual in the belly, it is a sign that the act is painful, as in pleurisy and rheumatism of the walls of the chest.

Running from the nose and mouth is generally associated with this class of complaints.

3. *Signs of Diseases of the Digestive Organs.*

When the appetite is much greater than natural, it is usually a sign of worms, or irritation of the stomach. In diarrhœa, the discharges from the bowels are frequent and watery; in constipation, infrequent, dry and hard. When an animal passes blood, it is generally from dysentery, piles, ulcers in the bowels, or a rupture. Swelling of the belly, unusual discharges of wind, and fits of giddiness, are common in colic and indigestion.

4. *Signs of Diseases of the Heart.*

These are indicated by violent convulsive beating of the heart, easily perceived by the hand placed behind the left elbow; by a jerking, intermittent, unequal and irregular pulse; by habitually cold ears and legs; by swelling of the legs and the belly; by difficult breathing, much increased by slight exertion; and by general sluggishness and a tendency to lay on fat. If on carefully listening to the sound of the heart, it is found to give forth sounds different from those usual in healthy animals (with which, as we have said, the student must make himself thoroughly familiar), then there need be no further hesitation in pronouncing the presence of heart disease.

5. *Signs of Diseases of the Kidneys, Bladder and Sex Organs.*

Profuse staleing, usually accompanied with excessive thirst, is a symptom of diabetes, a very serious disease. Bloody urine, "red water", and "black water", may signify a mechanical injury to the bladder, inflammation of the kidneys, kidney worms, stone in the bladder, or in cattle, one of those very dangerous diseases called murrains. When the urine cannot be passed, it may be from a stone or a stricture; it also occurs in spinal meningitis in horses.

Carrying and bearing the young, and the various diseases to which the female is liable, at and after this period, are all of obvious symptoms. This class of maladies has a peculiar importance to the stock breeder, as it has been again and again demonstrated that the higher the breed and the more refined the blood—that is, the more costly the animal—the more is it liable to numerous and grave interferences with these acts of reproduction.

PART II.

The Diseases of the Horse.

GENERAL REMARKS ON THE DISEASES OF THE HORSE.

Of all the domesticated animals, the horse is the one whose diseases have received the closest study. Until the present century he might justly have been considered the most really valuable of the lower species. With our improved modes of locomotion this is hardly now the case, and the high esteem in which he is yet held arises largely from tradition, the competition of traders and the love of display, rather than his intrinsic worth to man.

As he is most highly prized for the qualities of grace and speed in motion, especial attention has been long paid to the prevention and removal of whatever would impair these powers; and hence we shall have to consider a long list of lamenesses in the horse, which deteriorate his value exceedingly, while in other animals they are of little or no importance whatever. This list is longer on account of the structure of the horse's leg and foot, which in delicacy and complexity stands unsurpassed and probably unrivalled among the wondrous exhibits of comparative anatomy.

Another reason for our increased acquaintance with equine diseases is that, as the horse, in this country at least, is not fed for the table, there is no economy in knocking him in the

head the moment he shows signs of disease, as we observe various writers on cattle, sheep and swine recommend in reference to those animals. A dead horse is proverbially of the least possible use. Hence the owner will naturally spare no reasonable pains to keep him alive, as a lame or a sick horse is better than no horse at all.

The equine species, in which we include the mule and the ass, differs remarkably from the other herbivorous animals we shall consider, in having but one stomach. The tract of the bowels is enormous; if spread out, it is estimated they would cover *ninety square feet.* Like all the herbivora, he responds very slowly to certain medicines. He never vomits, so emetics are useless; and many purges act on him slowly and irregularly. Saline purges, for instance, as Epsom and Glauber salts, are quite unsuitable, sometimes appearing inert, or again acting so violently that they produce inflammation and exhaustion. For this purpose, aloes, especially Barbadoes aloes, on account of their cheapness, are preferred. These, if properly administered, will act in eight or ten hours. Senna, colocynth, buckthorn and other cathartics of value in man have scarcely any such effect on horses.

This species is more subject to high inflammatory diseases than the other three which we shall treat. Fevers and maladies of a low, typhoid type are comparatively rare in the horse. He is moreover of a courageous, enduring disposition, and will not yield to the attacks of disease as readily as an ox or sheep. Nevertheless, the treatment by bleeding, active purges, tartar emetic and calomel, heretofore promiscuously practised on him, is by no means to be commended; it belongs to a past age, and only lingers under the favor of ignorance and prejudice. Not many traces of it will be found in the following pages, as what we have to present is not a *réchauffé* of antiquated opinions.

NOTE.—In treating the diseases of Horses, we shall at the same time describe those which are common to both Horses, Mules and Cattle; thus avoiding a useless repetition which would be otherwise necessary when we come to treat of Diseases of Cattle. Many complaints are substantially identical, both in symptoms and treatment, in the two species.

On the following two pages we have placed in contrast the external and the internal anatomy of the horse. A careful study of these diagrams will be found of considerable importance in understanding the descriptions of diseases which will be contained in the pages that follow. The popular names applied to the external forms of the horse are of especial interest to every one who owns such an animal, and they should be made familiar by reference to the living subject.

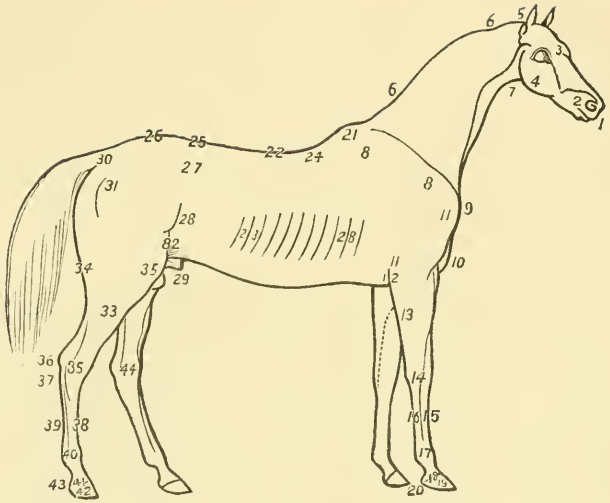

FIG. 19.—EXTERNAL ANATOMY OF THE HORSE.

1. Muzzle.
2. Nostril.
3. Forehead.
4. Jaw.
5. Poll.
6. Crest.
7. Windpipe.
8. Shoulderblade.
9. Point of Shoulder.
10. Breast.
11. Arm.
12. Elbow.
13. Forearm.
14. Knee.
15. Cannon bone.
16. Back sinew.
17. Fetlock, or pastern joint.
18. Coronet.
19. Hoof.
20. Heel.
21. Withers.
22. Back.
23. Ribs.
24, 24. Girth.
25. Loins.
26. Croup.
27. Hip.
28. Flank.
29. The sheath.
30. The root of the tail.
31. The hip joint.
32. The stifle joint.
33. Lower thigh.
34. The quarters.
35. The hock.
36. The point of the hock.
37. The curb place.
38. The cannon bone.
39. Back sinew.
40. Fetlock, or pastern joint.
41. Coronet.
42. Hoof.
43. Heel.
44. Spavin place.

FIG. 20.—INTERNAL ANATOMY OF THE HORSE.

1. The poll or occiput.
2. The lesser brain, cerebellum.
3. The greater brain, cerebrum.
4. The membranes of the nostrils.
5. The tongue.
6. The bones of the neck.
7, 7. The spinal cord.
8. The throat, or pharynx.
9, 9. The gullet, or œsophagus.
10. Entrance of the gullet into the stomach.
11. Exit from the stomach into the bowels.
12. The surface of the diaphragm.
13. The windpipe.
14. The lungs.
15. The heart.

a. The stomach.
b. The spleen.
c. The kidney.
d. One side of the womb.
e. The rectum, or lower bowel,
f. The anus.
g, h, i, k, l. The muscles of the thigh.

CHAPTER I.

DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

Congestion and Inflammation of the Brain—Phrenitis—Mad, Blind or Sleepy Staggers.
Cerebro-spinal Meningitis.
Convulsive Diseases or Fits—Apoplexy—Epilepsy—Falling Sickness—St. Vitus' Dance or Stringhalt.
Megrims—Vertigo—Giddiness.
Sunstroke.
Paralysis or Palsy.
Tetanus or Lockjaw.
Hydrophobia.

CONGESTION AND INFLAMMATION OF THE BRAIN—PHRENITIS—MAD, BLIND OR SLEEPY STAGGERS.

Definition.—A congestion or over fullness of the blood-vessels of the brain and its envelopes, passing into inflammation, accompanied with marked effects on the animal's mental condition.

Causes.—Exposure to the heat of the sun, blows on the head, suppression of urine, poisoning of various kinds, tumors in the brain, over driving in fat animals, feeding on distillery slops, the pressure of a tight collar and overloading the stomach.

Symptoms.—The most common form of the disease, both in horses and cattle, is that called stomach staggers or sleepy staggers. The animal at first is dull, listless and drowsy. The breathing is generally slower, and more or less snoring; the pulse also is slower, in the horse from 26 to 30 beats a minute. In walking the animal staggers and seems about to fall. If suddenly disturbed, it looks around excitedly, shivers

and seems frightened. It now and then thrusts its head against the wall of the stable, or rears and elevates its nose in the rack. The eyes are bloodshot and yellowish. As the disease advances, the feet and ears become hot and then cold by turns; the eyes are fixed; violent convulsions come on; the animal totters and sometimes falls; the sight is lost and the head is struck against anything that comes in the way. Sometimes the tongue lolls out of the mouth, or there is spasm of the muscles of the face, or general palsy.

The bowels are usually costive, the water scanty and high colored, and the frenzy in fits of greater or less severity.

Treatment.—In the early stages, if the pulse is full and slow, four to six quarts of blood should be at once drawn from the jugular vein from a large opening. But if the pulse is feeble and quick, no blood should be taken.

In all cases, give at once a smart purge.

No. 20.	Powdered aloes,	6 drachms.
	Calomel,	1 drachm.

This amount to a horse.

No. 21.	Sulphate of magnesia,	20 oz.
	Croton beans,	15 oz.

Mix and give to an ox or cow.

The animal should be kept as quiet as possible in a darkened stable, and have plenty of water, but no food, and the head should be often bathed with ice water. If the purge does not act thoroughly, repeat it on the second or third day.

When ice water is not at hand, the following cooling lotion will supply its place:—

No. 22.	Common salt,	
	Saltpetre,	
	Sal ammoniac, each	4 oz.

Mix in a gallon of water.

To reduce the fever, the following is a useful preparation:—

No. 23.	Powdered digitalis,	1 drachm.
	Saltpetre,	2 drachms.

Mix and give as a ball several times a day.

Not unfrequently after the attack is over some palsy of the limbs, generally the hind limbs, remains. This can be most successfully met by doses of *strychnine*, beginning with three grains twice a day, and cautiously increasing it a grain every two days, until the animal is taking twelve or fifteen grains daily.

CEREBRO-SPINAL MENINGITIS.

Definition.—A congestion passing into inflammation of the brain and spinal marrow and its envelopes, accompanied by paralysis.

Causes.—This disease is generally epidemic, and confined to the cold months of the year. By most, it is attributed to a blood poison floating in the air. Some of the epidemics, as that in New York city in 1871, were extremely fatal, and of the horses attacked with it early after its appearance very few recovered. It is believed not to be contagious, so that little advantage is gained by separating horses.

Symptoms.—In its more severe form, the animal is generally attacked suddenly with loss of power to swallow, or with a spasm; the hind quarters soon turn cold to the touch, and there is great tenderness on pressure at some spot along the spine. The horse loses the power to stand, the bladder and bowels discharge their contents without effort, and the neck becomes stiff and contracted similar to lockjaw. In some cases frenzy comes on before the palsy, the animal beats its head against the wall with great violence, uttering horrible cries, and soon dies from the agony. The temperature of the skin is lower than in health, and of the rectum but little higher. When the latter rises to 103° or 104° death is imminent. The urine and pulse are not much altered until the disease is well established, but the breathing is more or less snoring as a rule.

Treatment.—The first step is to put the animal in a well

made sling. Unless this is done within 24 hours from the commencement of the attack, there is but slight hope of his recovery. Next, he should be well brushed and the legs wrapped in woolen cloths. If he can swallow, a moderate amount of good soft food should be given. The stable should be kept warm, darkened and quiet, and if there is suppression of urine, it should be drawn off with a catheter.

As to medical treatment, there is no use whatever in bleeding, purging or blistering. The most successful treatment is to inject with the hypodermic syringe full doses of *sulphate of atropine*, and give *ergot* with the food; or if the animal cannot swallow, inject ergotine along with the atropine. (See page 44). Ice to the spine, or hot salt bags, as some prefer, may be tried, but has not produced any marked results; nor has cauterizing the spine with the hot iron. Where the strength is failing, full doses of whiskey, either by the mouth or rectum, will sometimes keep up the vital powers and give a chance for recovery. Animals should not be used or driven as soon as they show any signs of the disease, nor should they be put to work for some time after such an attack, as it would be very liable to bring on a fatal relapse.

When the hypodermic syringe is not at hand, the following combination will supply the place of the remedies mentioned:—

No. 24. Extract of belladonna, 2 to 3 drachms.
Powdered ergot, 1 oz.
Make into a ball or drench—give three times a day.

Another remedy which is believed to have a soothing effect is *bromide of potassium*. It should be given in ounce doses, repeated until the animal is brought under the influence of it and suffers less from the pains.

CONVULSIVE DISEASES OR FITS—APOPLEXY—EPILEPSY—FALLING SICKNESS—ST. VITUS' DANCE, OR STRINGHALT.

Apopletic fits are very rare in horses, though common in cows. They will be described later in this work under the

diseases of calving, (Parturient Apoplexy). Epileptic fits are also very uncommon either in horses or cattle, though often seen in overfed pigs. The most usual form of the disease will be described under Vertigo or Megrims. The most practically important of this class of complaints is that known in the horse as "Stringhalt."

This name is given to a habit of suddenly jerking up the hind limb when raised from the ground, and bringing it down again with more than usual force. It may be shown only when turning from side to side in the stall, or it may also appear in walking or trotting. Sometimes it is confined to one leg, sometimes it extends to both. Sometimes a horse will go twenty or thirty steps before he shows the halt; then all at once the leg will be suddenly lifted and brought down again with a peculiar sudden jerk.

There is no known cure for stringhalt, and it is pretty certain to increase with age and work; so that it constitutes a radical unsoundness in a horse. Rest, cathartics and full doses of belladonna will generally lessen it for a time, but are of no permanent benefit.

MEGRIMS, VERTIGO, GIDDINESS.

Definition.—A disease of the brain, characterized by temporary loss of control of the muscles, loss of sensation, and slight spasms of the muscles, but without inflammation.

Causes.—Overwork in fat horses, tight or badly fitting collars, exposure to the hot sun, constipation, hereditary tendency, and local irritations, as worms, etc.

Symptoms.—The animal when at work suddenly stops, reels and trembles, perhaps falls to the ground and lies for a few minutes partly insensible, then staggers to his feet, and remains excitable and nervous for several hours or days. There is no positive spasm, and the fits are liable to recur with greater or less frequency.

Treatment.—As soon as the earliest symptoms are noticed, the horse should be stopped, his collar removed or opened, his eyes shaded or covered, and cold water poured over his head. Blood may be drawn from the jugular vein, and the horse placed in a quiet stable and given an active purge. Horses subject to the disease should have a collar specially fitted to avoid any pressure upon the blood-vessels; and if young and fat, their diet should be restricted.

These measures will check an attack and lessen the likelihood of its recurrence. But megrims is substantially an incurable disease and constitutes a permanent unsoundness in a horse.

It no doubt is often a form of epilepsy, in which case we may have some chance of curing it by the use of one of the bromides, as:

No. 25.	Bromide of potassium,	½ oz.
	Powdered gentian,	1 drachm.

This amount two or three times a day for many weeks.

Another and cheaper medicine of some renown in epilepsy is recommended by Prof. Gamgee:—

No. 26.	Sulphate of zinc,	½ drachm.
	Linseed meal,	1 oz.

Make into a ball and give twice daily.

In stallions the fits have sometimes been found to disappear on castration; and when they are so frequent as to render the animal almost useless, this means should be tried.

The nitrate of silver is a medicine which has also been recommended.

No. 27.	Nitrate of silver,	6 to 8 grains.

Make into a ball with common mass, or molasses and meal, and give once or twice daily. Or it may be dissolved in the pail of water.

Whenever worms are suspected, or other sources of local irritation, these should be attended to in the proper manner.

SUNSTROKE.

Definition.—An injury to the brain from exposure to the rays of the sun and excessive heat, characterized by sudden loss of power of motion and of consciousness, either partial or total.

Causes.—This is a very common disease, in the hot months, in our great cities, and usually is directly caused by overwork in the sun without protection to the head. Those most subject to it are fat, young, feeble and old horses. Wearing a sun-shade or a wet sponge on the top of the head, giving an abundance of cool water, and wearing a breast-strap instead of a collar, are the principal preventive measures, and they should not be neglected.

Symptoms.—In severe cases the horse will suddenly stop, prop himself on his extended limbs, pant violently, drop to the ground and die in a convulsion. In more gradual attacks he will flag in his gait, be unsteady in his limbs, will spread his legs in standing and totter. The head is held low, the eyes protrude, the nostrils are dilated, the pupils of eyes smaller than natural, and the breathing rapid and snoring. On examination the skin is felt to be hot, the pulse quick and weak, and the heart beating violently and irregularly. Unless relieved, convulsions, palsy and death may ensue; or if recovery takes place, the attack leaves for a long time symptoms of dullness, drowsiness and irritability; while the horse is rarely ever after able to stand an ordinary amount of exposure or work in the hot sun.

Treatment.—Throw buckets of cold water over the whole body, using considerable force, and douching especially the head and neck. Having done this thoroughly, rub the skin energetically with rough cloths, as bagging, etc. Then repeat the douching. There is no use in giving injections, and positive certainty of doing injury by bleeding. The

best of all medicines is *quinine*. Throw 30 to 60 grains, by repeated injections, underneath the skin with the hypodermic syringe. This is the East Indian plan and nothing equals it in efficacy.

After the attack the animal should be turned into a well shaded field, where there is plenty of good water, for a few weeks.

As a drench to support the powers at the time of the attack, it is recommended to give as soon as possible:

No. 28.	Sulphuric ether,	2 oz.
	Water,	1 pint.

For a drench.

No. 29.	Tincture of aconite root,	20 drops.
	Ale or beer,	1 pint.

For a drench.

PARALYSIS OR PALSY.

Definition.—Loss of power over some of the muscles, owing to a disordered state of the brain or nerves, arising from disease, injuries or irritations.

Causes.—In the horse and cattle, palsy of the hind quarters is quite common from indigestion, constipation, and attacks of colic. In cows and mares it often arises from the womb, either at the time of the heat, or after giving birth. Such cases are usually temporary, and soon recover. Palsy from injury, or from some organic disease of the spinal cord are also not infrequent, and these offer little or no chance of improvement.

Symptoms.—The animal is at first seen to show weakness of one hind limb, with knuckling over at the fetlock, and difficulty of moving it, when the opposite limb may become affected. If the attack is severe, the animal falls on his haunches and is not able to rise. There is no fever, nor mental excitement, nor is the pulse or breathing affected.

Treatment.—This should be directed to remove the cause of the disease. When there is colic or constipation, give a good, brisk purge (No. 20); if there is tenderness along the spine, *ergot* in full doses with the food is called for. When it is in connection with calving, time and ordinary care will generally remove it.

Such measures failing, we must proceed to an energetic, general and local treatment.

Internally, one of the best drugs is *strychnine*, given as recommended in No. 20, or by throwing one-half to one grain under the skin twice daily, as

No. 30.	Strychnine,	2 grains.
	Sulphuric acid,	4 drops.
	Alcohol,	½ oz.

Every 10 drops contain 1-12 of a grain of strychnine.

Or it may be given as nux vomica:

No. 31.	Extract of nux vomica,	½ drachm.
	Milk,	1 pint.

For a drench twice a day.

Cantharides is another useful agent.

No. 32.	Powdered cantharides,	5 grains.
	Powdered ginger,	1 drachm.

Mix with meal to a ball and give twice daily.

Locally, in a valuable animal, it is worth while to try electricity. This has proved of immense service in paralysis in the human race.

Pouring cold water from a height and then immediately hot water brings about a powerful revulsion, and sometimes greatly strengthens the muscles.

Rubbing the parts with mustard stimulates them, and it is productive of good in some cases.

A mild blistering ointment may be rubbed in, as

No. 33.	Powdered cantharides,	1 oz.
	Oil of turpentine,	1 oz.
	Lard,	8 oz.

Mix with a gentle heat.

TETANUS OR LOCKJAW.

Definition.—A long continued, painful spasm of the muscles, which contract rigidly, often keeping the jaws firmly closed or locked.

Causes.—The most frequent cause is a wound in the legs or feet, often in itself of a trivial character, such as the penetration of a small nail, castration or docking. Occasionally the disease arises without known cause, and in rare instances becomes epidemic, attacking a great many horses in a district. Some believe it is more frequent in cold than in hot weather; but in Scotland Prof. Williams found that it is more common in summer. It is often seen in the horse, but very rarely in cattle.

Symptoms.—In the earliest stages there will be a stiffness of the muscles near the seat of the injury; the limb will be moved with difficulty. This stiffness increases and extends in two or three days over the body. The animal champs his jaws and grinds his teeth. Spittle flows from his mouth, and froth shows on his lips. The breathing grows more rapid, the pulse quickens, and the nostrils are dilated; but the special and unfailing signs of the disease are the protrusion of the haw, or winking membrane of the eye, and the closing of the jaws by the spasms of the muscles around it.

The bowels and bladder cease acting, the belly is stiff, and any attempt at swallowing brings on a dry hard cough.

Treatment.—Of the many plans and medicines recommended in lockjaw, most are of no sort of use. It may be premised by saying, that in every case where all the symptoms are firmly established before the fourth day of the attack, death may be expected and treatment is useless after that time. But where the symptoms are less complete, more

slow in developing, and where the patient is seen very early, there is a fair chance of success.

The first step is to inquire if there has been any wound to produce the disease. If there is, it should be examined, cleaned carefully, widened with a knife if it seems contracted or containing pus, and covered with a warm poultice mixed with laudanum or tincture of belladonna. Afterwards it is to be smeared with extract of belladonna.

The next thing, if not the first, is to place the animal loosely in slings, and the earlier this can be done in the disease the better. The surroundings of the patient are of the utmost importance. The stable must be darkened; should contain no other horses; be kept quiet, and no visitors be admitted. It is enough for the surgeon to look in twice a day and give what food, in the shape of nutritives and milk, the horse is able to take. Usually the thirst is great for several days.

Mr. Chawner recommends the use internally of:

No. 34.	Extract of belladonna,	4 drachms.
	Chloroform,	1 oz.

Mix with the drink and give every four hours.

Various English veterinarians give at the outset, one or two full doses of *aconite,* half a drachm to a drachm of the tincture of the root, and shut the animal up in a cool, dark place. They claim great success from this plan.

The rigidity of the muscles can sometimes be removed for several hours by hypodermic injections of morphia, 3 to 6 grains.

Lobelia, or Indian tobacco, has a reputation in some districts as a cure for tetanus in the horse. It is a powerful relaxant, and given in doses of half an ounce to an ounce of the tincture, will no doubt lessen or remove the spasm. But it is apt to return when the effect of the medicine passes away.

Prof. Gamgee advises the use of powerful purgatives early in the disease, as:

No. 35.	Croton oil,	6 to 8 drops.
	Powdered aloes,	4 to 6 drachms.

Mix for a drench.

Or

No. 36.	Castor oil,	6 oz.
	Croton oil,	12 drops.

To be given in linseed tea.

HYDROPHOBIA.

Definition.—A disease which arises spontaneously in the dog and cat and is communicated by their saliva to the horse, cow, sheep, swine and man. It affects the brain, nerves and mental faculties and is incurable.

Causes.—In the horse, cow and sheep, hydrophobia is always produced by the bite of a mad dog or other hydrophobic animal.

Symptoms.—These appear in the horse from 15 to 90 days after the bite; in cattle, after 20 to 30 days; in sheep, after 20 to 25 days; in swine, after 20 to 50 days. It is generally believed that mad animals have a great dread of water, and from this the disease receives its name. Most recent observers deny this entirely; and explain the mistake by the statement that the attempt to swallow brings on an exceedingly painful spasm of the throat, which throws the animal into a convulsion.

In the horse, the patient trembles or staggers; his eye is wild; he soon grows furious, and endeavors to bite or run at and trample down any one whom he can reach; he kicks violently, neighs, draws his yard, jerks his muscles, and finally drops paralyzed. Very peculiarly mischievous and dangerous propensities mark this species of madness, and distinguish it from the delirium of other diseases. In the

same way the ox is restless and excitable, turns out his upper lip, grinds his teeth, bellows loudly, and scrapes with his fore feet and rushes at all who approach. Sheep and hogs show in their own peculiar manners the ferocity and savage madness which is the characteristic of the disease.

Treatment.—This should not be attempted. The only proper plan is to shoot the animal, not only as soon as the earliest symptoms appear, but as soon as it is ascertained that it has been bitten by a mad dog. After the attack once shows itself, it is absolutely useless to try any remedies. Yet it is true that many animals, perhaps one-third of those bitten by undoubted hydrophobic dogs, never take the disease. Therefore, in cases where there is considerable value at stake, an effort at prevention may be made. The wound should be *thoroughly* cauterized, at the earliest possible moment, with nitrate of silver, strong oil of vitriol or the red hot iron. The animal should not be used, but placed in a roomy box-stall or well closed shady paddock, and left quiet and by itself until the period of development of the disease above mentioned has been wholly past. With moderate diet and an abundance of water this will no doubt render it less liable to succumb to the poison.

CHAPTER II.

DISEASES OF THE BREATHING ORGANS.

Cautions in Treating Diseases of the Breathing Organs.
Cold in the Head—Catarrh.
Nasal Gleet—Running from the Nose.
Cold in the Chest—Bronchitis—Chronic Cough.
Influenza—The Epizootic—Contagious Catarrhal Fever—Pink Eye.
Sore Throat—Laryngitis—Pharyngintis.
Inflammation of the Lungs—Lung Fever—Pneumonia.
Pleurisy.
Heaves—Broken Wind—Emphysematous Asthma.
Roaring—High Blowing—Thick Wind—Whistling.

As this class of diseases is the most common among stock in this country, we preface their description with a few general

CAUTIONS IN TREATING DISEASES OF THE BREATHING ORGANS.

1. *Be very cautious in giving purgative medicines.*

There is always a strong tendency for the inflammation to spread to the bowels, which would either prove fatal forthwith, or make a complicated and serious case of a simple one. Aloes, gamboge and large doses of salts are therefore not to be given. If the bowels are bound, injections of warm water, soap and water or linseed oil are all that is needed.

2. *Do not give large doses of tartar emetic, calomel, digitalis, lobelia or other weakening medicines.*

The great danger in these diseases is from weakness and

exhaustion; and it is very obvious that this danger is vastly increased by increasing the weakness.

3. *Use blisters, mustard, turpentine and other powerful counter irritants very moderately.*

In the horse, the application of any of these causes very great disturbance and distress, high excitement, an increase of fever, and often thus they do far more general harm than local good. Warm fomentations, poultices, etc., are generally much better.

4. *Be especially careful how you bleed.*

Some of the best English veterinarians say, *never* bleed in this class of diseases. But in the United States, leading authorities concede that in the very early stages of inflammation of the lungs, when the animal is young and strong, when the fever is high and the pulse firm, full and hard, three or four quarts of blood promptly taken from the jugular vein will cut short the disease. But it is very rare that we find all these conditions united, and when we have such potent means for lowering the pulse as aconite, veratrum viride and lobelia, we need rarely draw our lancets in these cases.

5. *Never give medicine by drenches in throat disease or where there is much coughing.*

Not only does a neglect of this rule often greatly aggravate the disease, by exciting and half strangling the animal, but it frequently disturbs the bowels and thus leads to serious complications.

It will be seen that most of the above rules completely reverse those laid down by the old farriers, and even those advocated by such comparatively recent writers, as Youatt, Martin, Stonehenge, Mayhew, Slater, etc.; but they are those now accepted and taught by the most eminent veterinarians in England and America.

COLD IN THE HEAD—CATARRH.

Definition.—An inflammatory affection of the lining membrane of the nostrils and parts adjacent.

Causes.—Sudden changes of temperature; exposure to wet and cold; change from country air to city stables; chills in changing the coat, etc.

Symptoms.—Sneezing, running from the nose and eyes, redness of the eyes and of the membrane of the nose, slight feverishness, dullness, weakness. The discharge from the nose is at first thin and colorless, but soon changes to a thick, yellow matter. When the case becomes chronic, it is called *chronic catarrh.* The discharge may then become of an offensive odor, and varies in quantity, sometimes being from one nostril only. It is sometimes mistaken for glanders, but is easily distinguished, as in glanders the discharge is thin and sticky, and generally without any perceptible smell.

Treatment.—This is simple and easy, if begun in time. Place the animal in a well ventilated stall, but not exposed to draughts, keep him blanketed if the weather is cold, and make him inhale steam from a bucket of hot water stirred with a wisk of hay, and heated by a hot iron occasionally thrust in it. A few ounces of nitre may be dissolved in his water. Purgatives and bleedings should not be thought of.

Give internally:—

No. 37. Extract of belladonna,
Powdered camphor, of each, 1 dr.
Mix and give as a ball or smear on the tongue.

If the fever runs rather high, take

No. 38. Spirit of ammonia,
Ether, each, 2 dr.
Put in half a pint of linseed oil or gruel.

Both the ball and the fluid should be given every night and morning. If the disease threatens to extend to the

throat, wrap it well in a large poultice containing some mustard. When the earlier symptoms yield, the principal object becomes to build up the strength and improve the appetite. For this we can use

No. 39. Carbonate of ammonia,
Gentian, of each, 2 oz.
Make into 8 balls with linseed meal, and give one night and morning.

Mr. Finlay Dun finds the following a useful draught when a horse has cold, fever, and impaired appetite:—

No. 40. Epsom salts. 2 oz.
Nitre,
Powdered gentian,
Solution of acetate of ammonia, each, 1 oz.
Mix in a pint of gruel.

Another valuable mixture, where there are catarrhal symptoms and sore throat, is:—

No. 41. Nitre, 4 drachms.
Powdered camphor, 2 drachms.
Ipecacuanha,
Extract of belladonna, each, 1 drachm.
Make into a ball, and give one every two hours,

Prof. Gamgee recommends the "abortive treatment" in commencing catarrh, by injecting the nostrils daily for three or four days with the following:—

No. 42. Sulphate of zinc, 2 drachms,
Tepid water, 4 pints.
For a nasal injection.

The same may be used with advantage in the chronic forms of nasal gleet.

NASAL GLEET.

Definition.—A low form of chronic inflammation affecting the lining membrane of one or both nostrils, and usually extending into the pouches or sinuses in the upper jaw-bone which connect with them.

Causes.—The gleet may be the result of a neglected catarrh, especially in scrofulous horses; or the consequence

of influenza or the epizooty; or from some foreign body which has accidentally or purposely been thrust up the nose; or from the growth of polypi, cancer, etc.

Symptoms.—The horse may and may not have a cough; his condition is unthrifty, his coat poor, appetite irregular, and bowels loose or constipated; or again none of these general symptoms is present.

There is a discharge from one or both nostrils. It is irregular in quantity, bluish white in color, rather thick and sticky, generally foul smelling. Small ulcers and excoriations may be seen on the membranes of the nostrils—but not the characteristic, pit-like depressions of glanders. The membrane is also changed in hue, and often swollen and thickened.

The question constantly occurs in these cases whether we have to do with a case of glanders; and not unfrequently it is a difficult one to answer, until the case has been watched for several weeks. It is prudent to be on the safe side, and recommend the animal be separated from all others, and his attendant to exercise great caution in handling him.

Treatment.—If there is a foreign body or a polypus present, it must be removed.

When no such obvious cause is to be found, the nostril is to be syringed daily with an antiseptic, cleansing wash, as:—

No. 43.	Tincture of chloride of iron,	1 oz.
	Water,	1 qt.

To be used once a day.

A sharp fly blister should be laid upon the face over the chambers and sinuses of the nose. This often brings about prompt improvement.

Chloride of lime should be sprinkled in the bottom of the manger, so that the horse when eating is constantly inhaling its odor.

Inhalation of sulphurous acid gas, well diluted with air, is frequently useful. The gas is mixed as follows:—

Mix half an ounce of the milk of sulphur with as much powdered charcoal, and burn it in a moderate sized, loose stable, allowing the horse to remain in the atmosphere for half an hour. Repeat this daily. If it causes much coughing, it is too concentrated, and must be diluted with more air by opening the door.

For the chronic form, or nasal gleet, one of the following washes should be syringed up the nostrils every morning:—

No. 44.	Chloride of zinc,	30 gr.
	Water,	2 qts.

Or

No. 45.	Carbolic acid,	1 oz.
	Water,	2 qts.

As the best internal medicine in such cases, Mr. Chawner recommends:—

No. 46.	Sulphate of copper,	
	Nitre,	
	Powdered gentian, of each	1 oz.

Make into a ball with linseed meal, and give every night and morning.

COLD IN THE CHEST—BRONCHITIS—CHRONIC COUGH.

Definition.—Inflammation of the lining membrane of the windpipe and smaller air tubes leading to the lungs, characterized by hoarse cough and shortness of breath.

Causes.—Exposure to sudden changes of temperature; standing uncovered when heated by driving; standing in drafts, and getting chilled from wet, etc.

Symptoms.—The most prominent is the cough. This is at first dry and ringing, but soon becomes hoarse, loud, and in spells. The pulse and breathing are both generally increased, sometimes very much so, to the extent of seventy or eighty in the minute. The animal is dull and listless, hangs

the head, is thirsty, and drops ropy mucus from the mouth. The bowels are generally constipated, and the urine high colored.

On examining the chest there is no dullness on percussion, which distinguishes it from pneumonia, and the breathing is evidently not painful, which marks it off from pleurisy. On listening with the ear, moist bubbling sounds can be heard in the chest, caused by the mucus in the air tubes in the lungs.

As the disease advances toward recovery, a profuse discharge issues from the nostrils, the inflammation gradually subsides, the cough becomes less hoarse and more vigorous, the discharge becomes thinner and finally ceases. But if the progress is toward a fatal issue, the breathing increases in rapidity, the pulse becomes feeble and rapid, a bloody froth hangs from the mouth, and convulsions seize the animal while coughing, and close the scene.

Treatment.—All weakening measures, such as bleeding, tartar emetic, etc., are to be avoided; so also are all "cough mixtures," as what are called expectorants are almost useless in the lower animals. In the very first stage of the disease, while the membranes are dry and the cough ringing, a full dose of an opiate may be given with great advantage. The hypodermic injection of morphia is the most desirable form. Next to this, 60 to 80 drops of tincture of aconite given in a pint of water every two hours will reduce the pulse promptly. Later on, to soothe and relieve cough, take

No. 47. Carbonate of ammonia,
Powdered camphor,
Extract of belladonna, each 1 dr.
Make into a ball with linseed meal, and give this amount three times a day.

For the feverishness, half-ounce doses of nitre may be given in the water once or twice daily. There is often profuse

staleing in the course of the disease, which is beneficial rather than otherwise. If the bowels are constipated, injections of oil and soap and water are far better than aloes or other purgatives. If there is much weakness remaining, tonics such as No. 46 are called for.

Chronic Cough is a troublesome and common result of a neglected cold. The cough is generally loud and metallic, and often is accompanied, especially in cattle, with emaciation and weakness. Very many remedies have been suggested for it, and when one fails after a reasonable time, it is well to try another. Professor Williams recommends:—

No. 48.	Prussic (hydrocyanic) acid, dilute,	40 to 60 drops.
	Nitre,	
	Bi-carbonate of Soda, each	1 oz.
	Water,	1 qt.

This amount twice a day, a strong blister to the breast, and careful housing and nursing.

Mr. Chawner prefers external applications, of which he says the following is the best:—

No. 49.	Croton oil,	15 to 20 drops.
	Glycerine,	1 oz.

To be rubbed on the throat and around the windpipe once every ten days.

Mr. Finlay Dun recommends the following cough mixture:—

No. 50.	Fowler's solution of arsenic,	
	Chlorate of potash, each	1 oz.
	Extract of belladonna,	1 drachm.

Make into a draught, with water or gruel. Valuable in chronic irritable cough, especially when remaining after attacks of influenza or sore throat.

No. 51.	Powdered camphor,	
	Extract of belladonna, each	1 drachm.
	Sweet spirits of nitre,	2 oz.

Give in a pint of cold gruel several times a day to horses or cattle, where there is commencing cough and sore throat.

An ordinary cough and fever draught is:—

No. 52.	Powdered digitalis,	½ drachm.
	Nitre,	½ oz.
	Water,	1 pint.

For a drench.

The following is recommended as a useful drench in obstinate coughs:—

No. 53.	Solution of potash,	1 drachm.
	Linseed oil,	2 oz.
	Molasses,	1 oz.

Give in a pint of soft water or milk twice a day.

Tar water has been well spoken of:

No. 54.	Tar water,	
	Lime water, each	½ pint
	Powdered squills,	1 drachm.

This drink every morning in obstinate coughs.

As a sedative mixture, to allay the violence of the cough, we may employ:—

No. 55.	Nitre,	4 drachms.
	Powdered opium,	2 drachms,
	Prussic acid (dilute).	1 drachm.

Mix in a pint of mucilage or linseed tea, and give half a tumblerful three times a day.

Sometimes a chronic cough of long standing is benefitted by a blister on the chest. Instead of the usual cantharides plaster we may use the following, which leaves less of a blemish:—

No. 56.	Croton oil,	1 drachm.
	Sulphuric ether,	
	Alcohol, each	10 drachms.

Apply with friction.

Expectorants, as they are called,—medicines designed to loosen the cough and hasten the restoration of the secretions to their natural condition—do not act with as decided benefit in the lower animals as in man. They are, however, occasionally useful. One of the best combinations is:—

No. 57.	Gum ammoniacum,	2 drachms.
	Powdered squills,	
	Aloes, each	1 drachm.

Mix with mass or meal to a ball, and give every morning in long standing coughs.

Or if the bowels do not seem costive, and the cough is of an irritable, easily excited, spasmodic character, the aloes can be beneficially replaced by opium, in the same quantity.

An excellent combination is:—

No. 58.	Muriate of ammonia,	½ oz.
	Ipecauanha,	
	Liquorice powder, each	1 drachm.

Mix with tar, honey, or molasses, to form a ball, and give one every morning to break up a cold on the chest.

INFLUENZA—THE EPIZOOTIC DISEASE—CONTAGIOUS CATARRHAL FEVER—PINK EYE.

Definition.—By these and other names the disease is known which in the fall of 1872, and often before and since has swept through the United States attacking almost every horse. It is a contagious epidemic disease, characterized by inflammation of the membranes of the air passages, discharge from the nostrils, cough and debility. It is quite fatal, the mortality in the Atlantic States being in 1872 over 10,000 horses in a month.

Cause.—The immediate cause is wholly unknown, but it is believed to be owing to some blood poison which spreads through the air.

Symptoms.—The earliest symptoms are weakness shown in a staggering gait, hanging head and trembling, shivering as from cold, loss of appetite; watery discharge from the eyes and a staring coat soon follow. The pulse is quickened and weak, from 50 to 60 in the minute, there is a short dry cough and the breathing is a little hurried. Later on the pulse rises to 80 or 90, the temperature to 104° or 105°, and the breathing to 40 or 50 times per minute. The body is

propped up by the extended legs and the horse is evidently afraid to lie down.

The bowels are bound, the urine scanty. Often the disease extends to the throat and lungs, bringing in bronchitis and pneumonia as complications. The nose discharges a white, yellowish or greenish matter. Sometimes rheumatic swellings and tenderness take place in the muscles and joints of the limbs, and may last for months, leading to abscesses and fistulæ. Death comes through weakness and exhaustion, suffocation, paralysis, or clots forming in the heart.

Treatment.—Here again any lowering treatment by aconite, tartar emetic, lobelia, bleeding or purging is simply murderous. If the bowels are costive, small injections of warm water or oil are in order. From the first, begin with tonics and stimulants. Mr. Chawner considers the very best to be that given No. 39. When the cough is very distressing the following mixture will relieve it:—

No. 59.	Extract of belladonna,	½ oz.
	Powdered opium,	2 drachms.
	Powdered camphor,	3 drachms.
	Powdered liquorice,	2 oz.
	Molasses,	½ pint.

Mix them well together and smear a spoonful on the tongue two or three times a day.

Good nursing is indispensable. The horse should be well blanketed and wrapped, and his food should be soft, nourishing and cooked. An ounce of saltpetre should be placed in his drink bucket.

When after the worst is over there appear signs of dropsy by swelling of the legs or sheath, one of the following prescriptions will be found very efficacious:—

No. 60.	Iodide of potassium,	
	Carbonate of ammonia,	
	Powdered gentian, of each	1 oz.

Make into 8 balls and give one morning and evening.

Or,

No. 61.	Iodine,	
	Iodide of potash,	
	Camphor,	
	Extract of belladonna, each	½ drachm.

This is highly spoken of by Mr. Finlay Dun to allay the epizootic cough, sore throat and catarrh. A similar compound is:—

No. 62.	Iodine,	20 grains.
	Iodide of potassium,	1 drachm.
	Sweet spirits of nitre,	2 oz.
	Water gruel,	1 pint.

For one dose two or three times a day.

Recovery should begin after four or five days, but for weeks afterwards the horse must be given little or no work, as in very many cases a too early return to labor has led to fatal relapses.

During the disease a stimulating and soothing draught may be prepared as follows:—

No. 63.	Powdered camphor,	
	Carbonate of ammonia, each	2 drachms.
	Sulphuric ether,	1 oz.

Give in a pint of cold ale or beer, two or three times a day.

Or,

No. 64.	Sweet spirits of nitre,	
	Solution of acetate of ammonia, each	2 oz.
	Extract of belladonna,	1 drachm.

Give in a pint of water as a stimulant and anodyne draught.

Mr. Finlay Dun says that in the roaring, noisy respiration which accompanies some forms of epizootic sore throat, no medicine gives such immediate relief as the subcutaneous injection of *belladonna* or *atropia*. For the spasmodic cough which often follows the attack, the same writer recommends:—

No. 65.	Chloroform,	1 drachm.
	Alcohol,	10 drachms.
	Extract of belladonna,	1 drachm.

Give in a pint of cold linseed gruel, and let it be swallowed very slowly, so as to insure more prolonged local effect.

SORE THROAT—LARYNGITIS—PHARYNGITIS.

Definition.—Inflammation of the lining membrane of the upper parts of the food and air passages, usually accompanied with cough, difficult swallowing, and fever. Although a distinction is drawn between laryngitis and pharyngitis, practically they are nearly always both present when either is.

Causes.—The same that give rise to colds and catarrhs. In addition to those, bots may cause it in horses.

Symptoms.—In its acute and severe forms this is a dangerous disease. The breathing rapidly becomes difficult and sounds hoarse. The inspiration is longer than the respiration. The animal's nose is protruded, the eyes are prominent, watery and bloodshot. There is a distressed expression of the face, a hoarse rasping cough, cold sweats on the body and legs, and they and the ears feel cold to the touch. The animal stamps its feet repeatedly and is excitable. Prostration and death may rapidly ensue. Generally, however, these symptoms are present in a much milder form. There is usually a running from the nose, and evident pain in the act of swallowing.

Treatment.—This should be prompt where the symptoms are of the severe type above described. The throat should be fomented with cloths wrung out of hot mustard water, the animal's head should be held over a bucket of hot water so that he can inhale the steam, and if signs of strangling and suffocation appear, no hesitation must be had to open the upper part of the windpipe lengthwise with a sharp knife, and a tube of lead be inserted for the animal to breathe through. Should the attempt to steam the throat excite the horse, it should not be pushed, as it is of great importance to keep him quiet.

Owing to the difficulty of swallowing, medicine cannot well be given by the throat; but the compound cough mix-

ture, No. 47 can be advantageously smeared on the tongue; as can also the following:—

No. 66.	Powdered chlorate of potash,	4 oz.
	Powdered guaiacum,	1 oz.
	Molasses,	½ pint.

Mix and smear a spoonful on the tongue several times a day.

Much good will sometimes be done by mixing mustard with water to a thin paste, and painting it outside the throat.

When the patient is feverish, and the throat hot and dry, the following is a successful mixture:—

No. 67.	Powdered ipecac,	1 drachm.
	Solution of acetate of ammonia,	1 oz.

Give in a pint of cold linseed tea, and repeat it three or four times a day.

In the more chronic forms, astringent applications are useful, as:—

No. 68.	Tincture of myrrh,	2 oz.
	Camphor mixture,	4 oz.
	Honey,	6 oz.

Make into a soft mass, and give with a spoon.

Or,

No. 69.	Tannic acid,	2 drachms.
	Honey,	4 oz.

Mix and give as the last mentioned.

Rubbing the throat with mustard or blistering it may be required in cases of long standing. A stimulating embrocation will, however, often suffice. A very common one is:—

No. 70.	Oil of turpentine,	
	Solution of ammonia,	
	Olive oil,	equal parts.

Use by rubbing on the throat daily.

It is quite as efficient as many more complicated ones.

When a more decided action is desired, the croton oil blistering mixture, No. 56, will be found valuable.

INFLAMMATION OF THE LUNGS—LUNG FEVER—PNEUMONIA.

Definition.—An inflammation of the substance of the lungs, followed by a secretion of lymph, which fills them up and solidifies them, leading to death by suffocation, suppuration, or else to gradual absorption of the lymph and recovery

Causes.—The general causes of this common, dangerous and therefore important disease are much the same as for colds, namely, exposure to sudden changes of temperature, getting chilled or wet, and draughty stables. Any slight cold or sore throat may rapidly run into pneumonia. It is also brought on by irritating smoke and gases, poisons in the blood, wounds of the throat or lungs, and various exhausting diseases.

Symptoms.—The earlier symptoms are increased rapidity of the pulse, reaching 70 or 80 beats per minute; a temperature rising to 103° or 104° and above; chilliness; a dry, dull cough; and coldness of the legs and ears. The breathing is generally not very rapid at first, not more than 20 or 30 times a minute, and unless there is pleurisy, it is not painful. Sometimes a rusty colored, or blood stained mucus discharge from the nostrils takes place. The horse suffering from the disease will stand on his feet to the last, but an ox will lie down. After the first three or four days the breathing increases in rapidity, the pulse becomes feeble or intermittent, and the general weakness manifestly increases.

But none of these symptoms is positive proof of the presence of the disease. When, however, in addition to them we find *dullness on percussion* over those portions of the chest which in health are resonant, we need have no longer any doubt, as this dullness proves the lungs are solidified by the inflammation. In many instances, by applying the ear behind the shoulder, we can hear, instead of the natural soft murmur of healthy lungs (see page 73), a fine

crackling sound like the rustling of silk, which is a sure sign of the disease.

Treatment.—Few subjects in medicine have been more actively discussed than the treatment of pneumonia, and the best surgeons are not entirely agreed upon it yet. Nevertheless, most of the leading authorities agree in discountenancing bleeding, blistering, and purging, as well as calomel, tartar emetic and lobelia.

The following judicious rules are those laid down by Professor Williams:

1. Place the animal in a well ventilated loose box, but where the air is not too cold.

2. Clothe and wrap the body, extremities and head in suitable, but not too heavy cloths.

3. Give it as much water as it will drink, adding to the water, if there is much fever, about an ounce of nitre or 20 or 3 drops of tincture of aconite to the bucket full.

4. If the bowels are bound, loosen them by injections of oil or warm water.

5. If there is much weakness, give two drachms each of carbonate of ammonia and camphor, in the form of a ball, twice daily.

6. Let the food be simple, laxative, cooling and nutritious, as bran, boiled linseed meal, good hay, or cooked carrots or turnips.

7. If moderate diarrhœa or profuse staleing come on they are on no account to be checked, as this is an effort of nature to throw off the disease.

8. If there is great exhaustion, moderate doses of whiskey may be given, but there is no use of pushing them, unless their good effects are soon seen.

Prof. Gamgee believes that large mustard poultices to the chest are of value. He also teaches that in young and full

blooded animals it is good practice to bleed when the disease is seen in its early stages.

For the febrile symptoms at the outset, salines are of good service, as:—

No. 71.	Nitre,	½ oz.
	Sulphate of soda,	2 oz.

Mix with molasses to give with a spoon, or with a pint and a half of water as a drench.

Or,

No. 72.	Sweet spirits of nitre,	1 oz.
	Solution of acetate of ammonia,	
	Water, of each	6 oz.

For a drench repeated every two hours till the fever abates.

The power of aconite and veratrum viride to reduce the pulse and lessen the oppression on the lungs is undoubted; 20 to 30 drops of the tincture of aconite root may be given; or one to two drachms of the tincture of veratrum in water every two hours. The danger of using these medicines is that they are apt to bring about great depression of the system, and therefore their effects must be watched closely by an intelligent person and not left to an ignorant groom. As soon as their depressing influences are noticed in the falling of the pulse, the sweats, the trembling and the anxious eye, they must be suspended.

PLEURISY.

Definition.—An inflammation of the membrane which covers the lungs and lines the chest, followed by a secretion of a large quantity of watery fluid inside this membrane, and consequent pressure on the lungs. It may be on one or both sides.

Causes.—Exposure to cold is generally considered one of the commonest causes. Attacks sometimes follow clipping and shearing. It is also very frequent as an extension of the inflammation of pneumonia (pleuro-pneumonia), and bron-

chitis. Occasionally direct violence and wounds lead to pleurisy.

Symptoms.—At the outset of the disease there is generally a chill, staring coat, and coldness of the skin, with signs of pain, the animal pawing the ground and rolling. Soon, however, this gives way to so much stiffness and soreness that any movement is made unwillingly, and if pressed on the affected side the animal will indicate pain. The breathing is rapid and incomplete, as every act of respiration increases the pain in the chest. Hence it is largely performed by the abdominal muscles. The pulse is hard and quick, and there is a short, dry, painful cough. If the inflammation is extensive, the movements of the animal are very slow, unwilling and stiff. On listening to the chest in the early stage, a dry, creaking sound is heard, like two pieces of leather rubbed together, caused by the movements of the inflamed membranes upon each other.

In the second stage, which comes on in from two to five days, when the space between the membrane is filled with secreted fluid, this sound disappears. On percussion, the lungs sound solid, especially in their most dependent portions. The breathing now becomes more labored, other muscles are called on to aid, even extending to those of the tail, which is moved up and down with a motion like a pump handle; the nostrils are distended and flap, the pulse is small and irregular, and there are dropsical swellings. This condition is that of "water on the chest" or "hydro-thorax." If the water does not rise higher than one-third of the chest—easily ascertained by percussion—there is a fair chance of recovery.

Treatment.—In the very earliest stage, when the pain is usually most acute, a full dose of an opiate will cut it short in most cases. Thus we may give:—

No. 73. Laudanum, ½ oz.
Linseed oil, 1 pint.
Give at a dose.

This may be repeated in a few hours if it does not check the symptoms. The painful sides should be fomented with hot water, the animal warmly clothed, and be allowed to drink plenty of water with an ounce of saltpetre to the bucket full. Bleeding, blisters and purging do little or no good, and very often decided harm. Good food, quiet and warmth are always needed.

If, after the acute symptoms have passed, there remain weakness, a rapid pulse (70 or 80), scanty urine of a high color, and no diminution in the water on the chest, a moderate mustard liniment may be rubbed into the chest, and full doses of iron given, which is one of the best known remedies in this condition.

No. 74. Tincture of chloride of iron, ½ oz.
This amount in a pail of water twice daily.

The effusion can also be drawn off by tapping the chest with a trochar. This is not nearly so dangerous an operation as it used to be thought. To perform it properly, divide the skin with a lancet between the eighth and ninth rib; then stretch the skin so that when it returns to its natural position it will cover the spot punctured by the trochar. Plunge the latter into the sac filled with the effusion, and let the contained matter flow out freely. Some recommend syringing the sack with dilute carbolic acid (one drachm to ten ounces of water). If the sac refills, it can be tapped again, and even a permanent external opening has been advocated by some. After being tapped, the animal should be fed up with nutritious food, iron tonics, etc.

It is well, in order to hasten the absorption of the water in the chest, to give the following:—

No. 75. Iodide of potassium,
Carbonate of ammonia, each 1 drachm.
Gentian, powdered, ½ oz.
Give as a ball or drench twice a day.

HEAVES—BROKEN WIND—EMPHYSEMATOUS ASTHMA.

Definition.—A chronic disease of the breathing organs, without inflammation, characterised by a peculiar breathing, the breath being drawn in with ease, but breathed out by two distinct efforts. There is always a peculiar cough of a hollow muffled sound, easily produced at any time by pressure on the upper part of the windpipe; and nearly always there is indigestion with flatulence.

Causes.—The immediate cause is rupture of the small cells in the lungs, so that the animal cannot expel the air he has drawn in without an extra and double effort. This rupture is brought about by putting the horse to hard work with his stomach full of coarse and undigested food; or by hereditary predisposition.

Symptoms.—Usually the character of the expirations above noted and the cough leave no doubt of the disease. On percussion, the chest is found to be more resonant than natural; and on listening with the ear to the chest, a rustling sound is heard, denoting the presence of air in the lung tissue. The symptoms are always more severe when the animal has a full stomach. The animal usually is unthrifty, dyspeptic and with a harsh dry coat.

Treatment.—A cure is impossible; but great relief may be had by feeding the horse on light nutritious food in moderate quantities, and by improving his digestion by alkalies, acids or tonics. A purgative should occasionally be administered and the bowels kept regular.

A celebrated recipe of the late Professor Dick in this disease was:—

No. 76. Calomel,
Digitalis,
Opium,
Camphor, of each 30 grains.

Make into a ball and give once or twice a day.

After the first week the calomel should be omitted and the three remaining ingredients continued.

Prof. Law considers the most useful of all medicines to be an arsenical preparation, as :—

No. 77.	Arsenic, Fowler's solution,	1 oz.
	Belladonna extract,	1 drachm.
	Tincture of ginger,	½ drachm.

Mix with a pint of water for a drench and give every morning for a month or two.

If the animal is turned out to pasture on clean short grass, and given this regularly, it will cure mild and recent cases.

ROARING—HIGHBLOWING—THICK WIND—WHISTLING.

Definition.—These peculiar noises all arise from some diseased condition of the windpipe. *Roaring* when of long standing is owing to atrophy or degeneration of the muscles of the larynx. *Thick wind* arises from an inflamed and thickened condition of the lower and smaller branches of the breathing tubes. *Whistling* is a sharp sound arising from a narrowing of the windpipe, usually at its upper portion near the larynx. Both roaring and whistling occur during inspiration.

Causes.—All these disorders may follow sharp colds, or pneumonia, strangles, diseases of the nose, tumors or tight reining. They are also frequently hereditary, and constitute an unsoundness.

Symptoms.—In addition to the peculiar sound above mentioned, the roarer generally has a cough which is peculiar, being a loud sharp dry sound, half a roar, half a cough. In thick wind the breathing is more rapid than usual, and there is a short, dry loud cough, which can be elicited at any

time by making the animal take a sudden movement, or giving him an unexpected blow upon the ribs.

Treatment.—The most successful treatment of roaring has been by firing or blistering the skin of the laryngeal region. It has been found that hypodermic injections of strychnia will excite the atrophied muscles, as in the form given below.

Thick wind may be improved and sometimes cured by proper medicines. Mr. Chawner recommends:—

No. 78. Powdered nitre,
Powdered opium,
Powdered camphor, each 1 drachm.

Make a ball and give it once or twice a day before feeding, for several days.

The following is excellent for the same purpose:—

No. 79. Powdered nitre,
Extract of belladonna, each 1 drachm,
Arsenic, 8 grains.

For one ball to be given once daily for a week.

Give easily digested food in small quantities at a time, and as little water as possible. Always let the horse rest an hour after feeding.

When, as is generally the case, roaring is owing to paralysis of the muscles of the larynx, it can be successfully treated by the plan recommended by Mr. Mayor of London. This is by injecting *strychnine* subcutaneously in doses of one-half to one grain, repeating this every two or three days. It is also reputed to have been of manifest advantage when given by the mouth, as:—

No. 80. Strychnine, 3 grains,
Linseed meal, Sufficient.

Make a ball and give twice a day.

Another plan of treatment is to rub daily or every other day the throat with iodine ointment:—

No. 81. Iodine, 1 drachm.
Iodide of potash, 2 drachms.
Lard, 2 oz.

Mix at a gentle heat.

And to give internally a cough ball of the following composition:—

No. 82.	Digitalis,	1 drachm.
	Nitre,	2 drachms.
	Powdered liquorice,	4 drachms.

Mix with enough tar to form a ball and give it twice a day.

The application of a seton to the front of the throat is a form of counter irritation which sometimes stimulates the muscles of the larynx.

CHAPTER III.

DISEASES OF THE ORGANS OF DIGESTION.

General Remarks on Diseases of the Digestive Organs.
Local Inflammation in and around the Mouth—Lampas—Vives—Barbs and Paps—Tender and Bleeding Gums—Decayed Teeth—Tooth Cough.
Indigestion and Dyspepsia.
Cribbing—Crib-biting—Wind-sucking.
Colic—The Gripes.
Tympany—Flatulent Colic—Tympanites—Swollen Belly.
Constipation—Costiveness.
Diarrhœa—Scouring.
Inflammation of the Bowels—Enteritis.
Dysentery—Bloody Flux—Colitis.
Congestion and Inflammation of the Liver—Hepatitis—Jaundice—The Yellows.
Intestinal Worms.
The Bots.

GENERAL REMARKS ON DISEASES OF THE DIGESTIVE ORGANS.

Most diseases of these organs arise from errors in feeding, or from folly in ignorant persons pouring down irritating medicines or administering injurious "condition powders." In the horse the intestines generally suffer; in the ox and sheep it is more frequently the stomachs.

The long tract of the intestines in the horse, to which we have referred on a previous page, and the important physiological fact that he has but one stomach with which to do the work for which four are assigned to the ox and sheep, render him highly sensitive to morbid disturbances of these organs. There is also a closer sympathy in him than in the others

between the stomach and the brain, slight attacks of indigestion frequently leading to vertigo or "staggers."

As was remarked when speaking of the anatomy of the digestive tract, it properly begins with the teeth and mouth and closes with the anus; in the consideration of its diseases, therefore, all the various parts and organs with which the food comes in contact from its entrance to its exit from the body will be discussed.

LOCAL INFLAMMATIONS IN AND AROUND THE MOUTH.

There are quite a number of localized inflammations which occur in and around the mouth, and which have received meaningless names from the old English farriers, most of which, however, are still preserved in one part of this country or another, through the traditions of the stable.

Symptoms.—The general symptoms which indicate that a horse has some painful swelling in the mouth are a champing of the jaws, a return of his food to the manger without swallowing it, and a loss of condition in consequence. He is restless and uneasy, and sometimes there is a dribbling of saliva from the mouth.

The principal forms of these inflammations, with their popular names and treatment are as follows:—

1. *Lampas.*

An active inflammation of the ridges or fleshy bars in the roof of the mouth, generally occurring in a young horse while shedding his teeth; sometimes occurring in older ones from overfeeding.

The "bars" swell so much that sometimes they project below the level of the nippers, and are so tender that all hard and dry food is refused.

The proper treatment is to scarify the bars with a sharp lancet; and should this not reduce the swellings promptly,

they should be touched with the stick of nitrate of silver, or swabbed with a strong solution every day until they disappear.

2. *Vives.*

These are chronic enlargements of the glands of the lower jaw, encroaching on the cavity of the mouth. They are liable to become tender and to discharge in the mouth.

The treatment is by applying to the skin over where the swelling can be felt an ointment of biniodide of mercury, one drachm of the biniodide to the ounce of lard, repeated daily until a free secretion from the skin is established. This will nearly always disperse them. Or they may be painted with tincture of iodine; or a tartar emetic ointment may be used, as:—

No. 83.	Tartar emetic,	2 drachms.
	Olive oil,	1 drachm.
	Lard,	1 oz.

Rub together the tartar emetic and oil until smooth, then add the lard. For a pustulating ointment.

3. *Barbs and Paps.*

By these and other names are known the swellings caused by obstructions of the ducts of the salivary glands. Their position indicates their origin.

The treatment is by an incision over the swelling with a sharp pointed knife; or by holding a pencil of nitrate of silver against it every day for a moment or two. The horse should have a moderate dose of a laxative medicine (3 or 4 drachms of aloes), and his food be changed for a time.

4. *Tender and Bleeding Gums.*

In young and scrofulous, and in quite old horses, it is not unusual to find the gums swollen, and to the touch soft, spongy and bleeding easily. Such horses have usually wide spaces between the teeth, which are found to be full of partly decomposed food.

As the act of mastication is painful, the animal performs it imperfectly, which becomes visible in his deteriorated condition, as well as by an inspection of his dung, which will consist in part of half digested food. The breath is unpleasant and signs of indigestion are present.

Treatment.—The matter lodged between the teeth should be removed every day with water and a properly constructed brush; afterwards the parts should be washed with a solution of chloride of lime (an ounce to the pint). A spoonful of the following should then be smeared on and around the teeth:—

No. 84.	Powdered chlorate of potash,	2 drachms.
	Honey or molasses,	2 oz.

The space between the teeth can be filled with gutta percha filling.

When, however, in very old horses, this condition is the result of natural decay of the processes of the gums, it can only be alleviated by cleansing the teeth and giving soft food, of an easily digestible character.

5. *Decayed Teeth.*

The teeth in the horse which are liable to decay are the molar or double teeth. The decay may attack the crown of the tooth, its neck or its fang.

Symptoms.—These may be briefly arranged as follows:—

1. Pain in eating as shown by "quidding," that is throwing back from the mouth masses of half chewed food.
2. Flow of saliva, "dribbling" or "slobbering."
3. Swelling of the gum, redness, and pain around the diseased tooth.
4. Presence of a black spot upon it.
5. Sharp pain when the tooth is smartly rapped.
6. A fetid, sometimes excessively foul breath.

Treatment.—The only treatment is to remove the decayed tooth. Animal dentistry has not as yet gone so far as to fill and preserve decayed teeth. It has, indeed, been done, the gutta percha filling being used; and there are reasons why in a young and valuable animal it would be far better than extraction; but to fill the teeth properly is a delicate task; and if done improperly, the result is worse than removal.

The chief objection to extraction is that the corresponding tooth of the opposite jaw increases in length and becomes an object of serious annoyance. It must be periodically examined ever after, and when it encroaches beyond its neighbors it must be rasped back to their level.

6. *Tooth Cough.*

Horses at four years old are very subject to a distressing paroxysmal cough. The animal will sometimes cough twenty or thirty times without stopping. The sound of the cough is loud, sonorous and prolonged.

The cause of this cough is an irritation of the mouth, extending to the throat, brought on by the cutting of the sixth molar tooth, which is the one standing last in the row, and the replacement of the third temporary molar by its permanent substitute, both of which occur at this age.

With the cough there may be associated some diarrhœa, indigestion and loss of condition from the difficulty in chewing the food properly, and the irritation it consequently causes.

Treatment.—This consists largely in careful dieting; hay, not much bran; grass, if in season. The mouth should be washed in some cooling mixture, as:

No. 85.	Borax or alum, powdered,	1 oz.
	Water,	1 pint.

Internally, a moderate laxative should be given, if the bowels are disordered, so as to cleanse them from the half

masticated food, and a daily dose of bicarbonate of soda, say one ounce, in the water.

INDIGESTION OR DYSPEPSIA.

Two varieties of indigestion are found in the horse, the one associated with over-fullness or engorgement of the stomach, the other with an ordinary use of that organ. The indigestion of cattle, known as "hoven," presents such peculiar features, that it will be considered in the section devoted to the diseases of cattle.

Causes.—Indigestion without engorgement arises in colts and young horses from the irritation of teething, from removal from the dam at too early an age, draughts of cold milk, suckling when the dam is heated, etc. In older animals defective teeth, debility of the stomach, and improper and irregular feeding are common causes. Indigestion with engorgement arises from ravenous eating, filling the stomach to an excessive degree.

Symptoms.—These are, in the indigestion without engorgement, loss of appetite or a capricious appetite, desire to eat filth, soreness of the mouth, and increased thirst. The animal is hide-bound, has a dry, scurfy skin, irregular bowels, and passes much wind. There are often a dry short cough and colicky pains, sometimes diarrhœa, and not unfrequently megrims or fits of giddiness. The feces are dark colored and of fetid odor; and often the urine is dark colored and on standing in a vessel deposits a reddish sediment.

Indigestion from over-fullness of the stomach is indicated by pawing with the fore feet, especially the near one, belching of wind, colicky pains, and some degree of fullness of the abdomen. There is also quick pulse, labored breathing, and dribbing of saliva from the mouth.

In severe cases the stomach becomes inflamed and the irri-

tation extends to the brain. The animal is giddy, staggers, is dull and sleepy. This condition is that called "sleepy staggers;" or the brain becomes inflamed, and we have "mad staggers"; conditions the management of which we have already considered (p. 87).

Treatment.—In ordinary cases of chronic indigestion, we should first examine the mouth and teeth and remove any cause of irritation from them; next we should inquire carefully into the diet, and see that it is moderate in quantity, nutritious, and offered at regular intervals; when these are done, it will be time to think of medicines.

Generally it will be advisable to give a mild purge of oil or of aloes, with ginger. After this has operated, the following is recommended by Prof. Williams as a tonic exercising a happy effect:—

No. 86.	Bicarbonate of soda,	
	Powdered gentian, each	½ oz.
	Powdered nux vomica,	20 grains.

For one dose twice daily.

Careful grooming is indispensable, and if the hair is thick clipping it will sometimes act almost magically.

Of the various stomach stimulants the following may be used:—

No. 87.	Calumba powdered,	2 drachms.
	Common salt,	
	Fenugreek, each	1 drachm.

Mix with molasses to form a ball.

Or,

No. 88.	Peruvian bark, powdered,	1 oz.
	Flour of mustard,	1 drachm.

This may be mixed with the food; or if refused, given as a ball.

When the indigestion is from a weak stomach, as occurs after an acute disease, two drachms of the medicinal dilute muriatic acid can be added to the drinking water two or three times a day, and will often exert a happy effect.

In acute indigestion, or impaction of the stomach, the object is to obtain an action of the bowels as promptly as possible. The horse cannot empty his stomach by vomiting, and hence the excess of food he has taken must be discharged by the intestines. Hence a powerful purge is demanded, as:—

No. 89.	Linseed oil,	1 pint.
	Croton oil,	20 to 30 drops.

For one dose.

Or,

No. 90.	Powdered aloes,	4 to 6 drachms.
	Oil of turpentine,	2 ounces.
	Calomel,	1 drachm.

For one dose.

The belly should be fomented with blankets wet with hot water, and injections should be thrown into the rectum of soap and water, oil, and even with a tablespoonful of tobacco tea. If sleepy staggers come on, a dose of whiskey and ginger is serviceable. Care should be taken that the animal does not throw himself down and fatally rupture his stomach.

An active injection for the rectum in such cases is:—

No. 91.	Croton oil,	20 to 30 drops.
	Oil of turpentine,	3 to 4 oz.
	Linseed oil,	1 pint.

To be thrown well up the bowels.

CRIBBING—CRIB-BITING—WIND-SUCKING.

These vicious habits in the horse are symptoms of a disorder of the digestive apparatus, and they are generally found in horses with a dry coat, hide-bound, and of unsightly appearance.

Symptoms.—A *crib-biter* seizes the manger or some other furniture with his teeth, arches his neck, and makes a belching noise. After a time this is followed by enlargement of the abdomen. A chronic cribber can easily be recognized by the appearance of his front teeth, which are worn and

rounded at their front edges, and by the enlarged and overgrown appearance of the muscles which depress the jaw.

A *wind-sucker* smacks his lips, gathers air into his mouth, extends his head or presses it against some solid body, arches his neck, gathers his feet together, and swallows air, blowing himself out to a very visible extent.

Both animals are subject to colic, indigestion and diabetes, the wind-sucker more, however, than the cribber.

Treatment.—These habits are considered incurable. They may be prevented by various mechanical means.

For cribbing, the throat may be compressed with a neck strap of peculiar shape, to be had of most saddlers; or what is called a "bar muzzle" may be applied, which allows the horse to eat but not to seize with his teeth. For wind sucking, a strap studded with sharp points of iron opposite the lower part of the jaw is the best preventive.

In both cases attention should be given to the indigestion and to the condition of the teeth and bowels.

COLIC—THE GRIPES.

The horse is subject to two kinds of colic, spasmodic and flatulent, which will be considered separately.

SPASMODIC COLIC—GRIPES.

Definition.—A spasmodic contraction of the muscular coats of the intestines, usually commencing suddenly, causing severe pain, and with a tendency to run into inflammation.

Causes.—These are various. Improper food, sudden changes of diet, exhaustion from overwork, drinking cold water when heated or exhausted, constipation, worms, and ulcers of the stomach, have all been set down as frequently leading to the complaint.

Symptoms.—In intestinal colic the symptoms are sudden

pain, pawing, kicking at the belly, looking round at the flanks, lying down, rolling, struggling, or lying outstretched; then suddenly rising, shaking the body and remaining a short time free from pain. After a short time the pain returns, and the animal goes through similar motions. During the attacks, the breathing and pulse are quickened. There are generally frequent small discharges from the bowels and bladder, which latter is apt to be distended.

Treatment.—The rational and only safe treatment of colic is first to relieve the pain with an opiate, and next to obtain a free action of the bowels by a purge, which is not too violent in its action. For the first of these, Prof. Williams recommends half an ounce to an ounce of laudanum in warm water; and for the second, from five to ten drachms of aloes.

Mr. Chawner prefers the following mixture, which he says he has never known to fail in a genuine case of colic:

No. 92.	Chloroform,	
	Laudanum,	
	Sulphuric ether, of each	1 oz.
	Linseed oil,	8 oz.

For one dose.

A still more convenient and also more prompt plan is to inject under the skin with the hypodermic syringe a full dose, say 10 grains, of morphia, and repeat it in an hour if the pain does not subside. Beyond this all that will be necessary will be an injection, as:—

No. 93.	Oil of turpentine,	½ to 1 pint.
	Soap suds,	1 qt.

As other valuable combinations, suitable to special cases, Mr. Finlay Dun recommends:—

No. 94.	Tincture of aconite,	30 drops.
	Powdered aloes,	½ oz.

Mix and give as a drench in a pint of water.

When there is an abundant generation of gas with violent swelling, an excellent drench is:—

No. 95. Powdered aloes, ½ oz.
Spirits of ammonia (milder),
Sulphuric ether, each 1 oz.
Mix with a pint of water and give promptly.

A prompt relief is generally afforded by chloral:

No. 96. Hydrate of chloral, 1 to 2 oz.
Sugar, 2 oz.
Mix in a pint of water.

One of the colic draughts of the Edinburgh Veterinary College is:—

No. 97. Laudanum,
Oil of turpentine, each 1 to 2 oz.
Linseed oil, 1 pint.
Mix for a drench.

For general service, few colic draughts are more effectual than

No. 98. Aloes, 4 or 5 drachms.
Laudanum.
Sulphuric ether, each 1 oz.
Rub down the aloes in a quart of warm water, and add the laudanum and ether when it is nearly cold.

Sweet spirits of nitre is another valuable remedy:

No. 99. Sweet spirits of nitre, 2 oz.
Aloes, 4 drachms
Dissolve the aloes in a pint of cold water, and add the spirits.

An old colic powder that used to be so famous that it was called the "Blessed powder" is:—

No. 100. Powdered aloes,
Powdered ginger,
Powdered senna,
Cream of tartar, equal parts of each.
The dose is about two ounces made into a ball or in a drench.

A recipe approved by Youatt is:—

No. 101. Oil of turpentine, 3 oz.
Laudanum, 1 oz.
Mix and give in a pint of warm ale.

If it does not relieve in half an hour, give as a second dose

half the quantity, together with one ounce of aloes dissolved in warm water.

Another appropriate combination is:—

No. 102. Sulphuric ether,
Laudanum,
Spirits of camphor, each 1 oz.
Essence of peppermint, 1 drachm.
Mix in a pint of gruel or ale.

TYMPANY—FLATULENT COLIC—TYMPANITES—SWOLLEN BELLY.

Definition.—Chronic distension of the bowels, with tendency to inflammation and rupture of their coats.

Causes.—This dangerous form of colic usually arises during the course of some other disease, but it may also appear as a consequence of spasmodic colic, or without any assignable cause. It is also attributed to food which easily undergoes fermentation, as raw potatoes, green clover, brewers' slops, and the like.

Symptoms.—In this form of colic the expression of pain though not so acute is much more constant than in the previous form. The abdomen is somewhat swollen and resonant on percussion. The pulse becomes rapid and feeble, the breathing difficult, the feet and ears cold, and the animal grows weak, staggering and delirious. There is often a dull, sleepy look about him, and when he moves it is evidently with care to avoid painful movements of the intestines. He lies down if at all, cautiously.

Treatment.—The object of treatment is to clear out the bowels thoroughly, yet by gentle means. A violent purge would probably lead to fatal inflammation. The most prompt mode to accomplish this is to oil the hand well and inserting it up the rectum, clean out the gut as far as the arm can reach. Then throw up a full injection of soap suds and oil of turpentine. Next, or previously, it may be, a dose

should be given by the mouth, intended to prevent the formation of the gas. Prof. Williams prefers to anything else, this drench:—

No. 103.	Solution of ammonia,	½ oz.
	Oil of turpentine,	1 oz.
	Linseed oil,	½ pint.

For a drench.

No food or water, or but very small quantities, should be given until there is relief by these measures.

The French veterinarians take a trochar and plunge it into the intestines, to give a vent to the gas; but this is rarely needed, and the relief it affords is only slight and temporary.

For flatulent colic, Prof. Gamgee advocates assafœtida, as:—

No. 104.	Assafœtida,	2 to 6 drachms.
	Linseed oil,	1 pint.

Mix and give as a drench.

Or,

No. 105.	Tincture of assafœtida,	2 to 4 oz.
	Laudanum,	½ to 1 oz

Mix with a pint of gruel or ale.

Where, in conditions of disease and exhaustion, the colic is from tympany or swollen belly, Prof. Gamgee has found chlorate of potash useful:—

No. 106.	Chlorate of potash.	½ oz.
	Sulphuric ether,	½ oz.
	Water,	½ pint.

To be given in gruel.

Or in a later stage, when it is desirable to act moderately on the bowels and correct the discharges, he gives:—

No. 107.	Chlorinated soda,	½ oz.
	Powdered aloes,	2 to 4 oz.
	Warm water,	1 pint.

Mix for a drench.

CONSTIPATION—COSTIVENESS.

Definition.—Absence or diminution of the natural discharge from the bowels, usually accompanied with dry and hard feces, straining and difficulty in their expulsion.

Causes.—Ill feeding, debility of the bowels, want of exercise, indigestion, and various other diseases, especially inflammation of the bowels. Paralysis of the bowels is an occasional cause, and one very dangerous to life. Its presence may be recognized by the absence of the intestinal murmurs always to be heard in health by listening to the abdomen.

Symptoms.—The hard, dry and scanty character of the evacuations is the principal sign. Colicky pains, hide bound, passage of wind and other symptoms of indigestion are often present. The animal does not thrive, and is lacking in spirit.

Treatment.—This is not always to be by strong purges. These often make the matter worse. The diet should be rendered more laxative, as mashes of bran and linseed meal, oat meal, etc., a change of water given, and mild aperient medicines with special stimulants to the bowels.

An excellent laxative mixture for horses and cattle, is:—

No. 108.	Flour of sulphur,	
	Cream of tartar, of each	2 or 3 oz.
	Molasses,	½ pint.

Mix this in the drinking water, or if distasteful, with water as a drench. It should be repeated every other day.

Strychnia and nux vomica have a special power of action on the bowels when partly paralyzed or excessively torpid. It is well to combine the nux with an aromatic and a laxative, as:—

No. 109.	Powdered nux vomica,	1 drachm.
	Powdered aloes,	2 to 3 drachms.
	Ginger,	2 drachms.

Mix for a ball and give one every other day.

The oils are gentle and beneficial laxatives, as:—

No. 110.	Castor oil,	1 to 6 oz.
	Linseed oil,	8 oz.

Mix and give in gruel.

Or a mixture of soap and aloes:—

No. 111.	Powdered aloes,	
	Soft soap, each	8 oz.
	Ginger,	4 oz.

Mix and make 8 balls. Give one every morning.

For cattle, a mild laxative and tonic combination, is:—

No. 112.	Epsom salts,	½ lb.
	Sulphur,	4 to 6 oz.
	Ginger,	
	Gentian, each	½ oz.

Mix in a quart of warm water for a drench.

DIARRHŒA—SCOURING.

Definition.—A condition characterised by loose, watery, and frequent discharges from the bowels without the presence of inflammation.

Causes.—Indigestible or irritating food; presence of worms; purgative medicines; too much water; disorders of the liver; and constitutional tendency. Flat sided and narrow loined horses particularly, are said to scour often, without apparent cause.

Symptoms.—In simple diarrhœa there is a frequent expulsion of half fluid discharges, brownish or clay-like in color, without offensive smell. The animal loses flesh if the disease continues, the appetite fails, and there is a general tendency to "run down."

Treatment.—As sometimes a diarrhea is often the attempt of nature to get rid of injurious matters in their intestines, it is well to aid her in the effort. If such a case is seen early, therefore, a moderate dose of castor oil, or linseed oil should be given. Later in the case, this will not answer so well;

but at all times it is well to avoid too suddenly checking the disease.

When the discharges are sour and fetid, the following powder may be mixed in the food two or three times a day:

No. 113. Powdered chalk,
Bisulphite of soda, of each 1 oz.
For one dose.

When this does not bring about an early lessening of the symptoms, the following is a favorite with Prof. Williams:

No. 114. Oil of turpentine,
Laudanum, each ½ oz.
Eggs, 3.
Beat up in a pint of warm water and give at one dose. Repeat two or three times a day.

The following is recommended for this continued purging by Mr. Chawner:—

No. 115. Sulphuric ether,
Laudanum, each 1 oz.
Tannic acid, 20 gr.
Mix in a pint of gruel or flaxseed tea, and give at one dose.

When the diarrhœa is owing to the action of violent purges, "superpurgation" as it is called, Prof. Williams says he knows of nothing better than the following:—

No. 116. Powdered chalk,
Laudanum, of each 2 oz.
Mix in a quart of flour gruel, and give every three hours till the purging is checked.

Apply hot applications to the abdomen, and do not let the horse drink cold water, which he will very much crave. Small quantities of flaxseed tea or gruel will partly allay his thirst. If he grows weak, wine or whiskey may be given him.

As general prescriptions in diarrhœa Mr. Finlay Dun recommends;—

No. 117. Spirits of camphor, 2 drachms.
Tincture of chloride of iron, 1 drachm.
Ether, 1 oz.
For one dose in diarrhœa after the early feverish symptoms have abated.

No. 118. Sulphate of copper, 1 to 2 drachms.
Powdered opium, 1 drachm.
Give as a ball or mixed in linseed tea two or three times a day in obstinate watery diarrhœa.

No. 119. Acetate of lead,
Powdered opium, each 1 drachm.
Give as the last prescription.

In cases of sour discharges, griping and moderate scouring, the following are antacids and mild astringents which will be found serviceable:—

No. 120. Powdered chalk, 1 oz.
Powdered opium, 1 drachm.
Creasote, 20 drops.
Make up with linseed meal and molasses for a ball.

Instead of the creasote, carbolic acid may be used in this prescription in the same quantity.

No. 121. Powdered chalk,
Catechu,
Ginger, each 1 oz.
Opium, 1 drachm.
Make up as the last.

This is useful when a mere astringent effect is desired, and when the bowels have got into an irritable relaxed condition. For the same purpose, whether in horses or cattle, the following recipes also answer well:—

No. 122. Powdered galls,
Powdered opium, each 1 drachm.
Chalk, ½ oz.
Make into a ball, or give in gruel or linseed tea.

No. 123. Powdered opium,
Powdered kino,
Powdered gentian,
Bicarbonate of soda, each 1 drachm.
To be made up and given as the last.

These prescriptions may be repeated once or twice daily, until the discharges are diminished.

Astringent clysters or injections are usually made up with starch water. It is a mistake to have them very copious.

From a pint to a quart is abundant in horses or cattle. Large injections are apt to increase the action of the bowels. Useful formulas are:—

No. 124.	Powdered opium,	2 drachms.
	Acetate of lead,	2 drachms.
	Starch water,	1 qt.

Throw half of this in at a time, and the remainder in half an hour to an hour.

No. 125.	Tannic acid,	2 to 4 drachms.
	Starch water,	1 pint.

For one injection.

INFLAMMATION OF THE BOWELS, ENTERITIS,

Definition.—An inflammation of the lining membrane of the bowels, tending to their softening and rupture. It is often rapid in its course and very fatal, destroying life in a few hours.

Causes.—The principal causes are over fatigue, cold from exposure or from washing in very cold water while the animal is heated. It is also believed to follow severe colic, excessive purging, irritating substances in the bowels, and kicks and blows on the abdomen.

Symptoms.—There is general depression with the characteristic signs of pain in the bowels, chill, and quickened breathing; small, frequent discharges from the bowels are also noticed. The appetite is lost, the pulse hard, wiry and quick, and the belly is tender on pressure. As the disease advances, the symptoms are very much those described under flatulent colic or tympanites (p. 134), with which inflammation of the bowels is often combined. The animal suffers severely, stamps and paws the ground; his face and eyes become haggard; cold sweats cover his body; his breathing is irregular and his pulse grows more and more rapid, small, weak and wiry. Delirium and convulsions may precede death. The marked symptoms are that throughout the

whole disease, in spite of the early small discharges of feces, constipation is continued and obstinate, and the belly swollen, tender and resonant.

It is of the utmost importance to distinguish colic from inflammation of the bowels, as the remedies required in the two conditions are directly opposite. We quote therefore the following table from an English authority:—

Symptoms of Colic.	*Symptoms of Inflammation of the Bowels.*
Sudden in its attack.	Gradual in its approach, with previous indications of fever.
Pulse rarely much quickened in the early part of the disease, but evidently fuller.	Pulse very much quickened, but small, and often scarcely to be felt.
Legs and ears of the natural temperature.	Legs and ears cold.
Relief obtained from rubbing the belly.	Belly exceedingly tender, and painful to the touch.
Relief obtained from motion.	Motion evidently increases pain.
Intervals of rest.	Constant pain.
Strength scarcely affected.	Rapid and great weakness.

Treatment.—To give strong purges, as the old farriers used to in this disease, is to double the agony of the animal and probably to kill him. Exactly the opposite treatment is to be pursued. *Opium* in large doses, say two drachms, must be promptly given and repeated every hour or two, until the pain is relieved. Or twenty grains of morphia may be thrown under the skin by the hypodermic syringe. Hot fomentations to the belly are useful, but not always convenient. After the severe symptoms are past, if the bowels continue bound, injections of warm water should be used to clear them out.

Bleeding, blistering and mustard plasters are not called for, and much more frequently do harm than good.

Mr. Finlay Dun uses *chloral* with opium. He says he has had the best results, and often saved life in those cases of deadly enteritis which occur in heavy draught horses, by giving a hypodermic injection of chloral hydrate, forty grains, immediately followed by one of morphia, three grains, and repeating both injections in about an hour. The combination may be made for the mouth, thus:—

No. 126.	Chloral hydrate,	1 oz.
	Morphia,	10 grains.

Give in syrup and water, and repeat every two hours for three or four times, or until symptoms abate.

A favorite prescription of the eminent English surgeon, Mr. Barlow, for enteritis, whether in horses or cattle, was:—

No. 127.	Calomel,	30 grains.
	Laudanum,	1 oz.

Mix in a pint of gruel.

This he repeated every hour until three or four doses were taken, or else relief occurred.

A method of treatment we can recommend is, when the case is seen early, to begin with small repeated doses of aconite:—

No. 128.	Tincture of aconite,	20 drops.
	Laudanum,	½ oz.

Give in lime water every hour or two, to the extent of three or four doses.

Large fomentations to the bowels are of great use. A blanket can be folded inside a rubber cloth which is fastened over the back. The blanket then can be kept thoroughly soaked with quite warm water with little trouble. If the symptoms of pain and exhaustion are relieved, the attendant need not trouble himself about the constipation. The utmost that should be done, will be after two or three days to use injections of warm water.

When the case is chronic, with pain, tenderness and tympany of the bowels, and a slight wearing fever, one of the most useful substances is nitrate of silver:—

No. 129.	Nitrate of silver,	5 grains.
	Opium,	½ drachm.

This amount in a ball of bread crumbs or linseed meal twice a day, gradually increased to double the dose if the disease does not yield.

The diet is always of importance. Bran or meal mashes made with linseed tea or slippery elm bark tea are suitable. Boiled food is better than uncooked. Large quantities of water should not be given at once, but small quantities often repeated. In chronic cases, if the animal is fed exclusively on *skim milk* for a week or two, it will sometimes effect a cure without other aid.

DYSENTERY, BLOOD FLUX, COLITIS.

Definition.—Inflammation of the lining membrane of the large intestine near the rectum, accompanied with straining, discharge of blood and fever.

Causes.—Poisonous and irritating food, exposure to cold and overwork, putrid and stagnant water, are quoted as causes. It is a rare disease among horses, but common enough in cattle, among whom it is sometimes epidemic. Some kinds of pastures seem particularly liable to bring it on, and hence it has been known as "moor ill," "wood evil," and other such names.

Symptoms.—The symptoms differ in the acute or sudden, and the chronic or long standing forms of the complaint.

Acute dysentery begins with pain in the lower bowel indicated by the animal raising or arching its back, a watery, bloody discharge from the rectum, which has an offensive smell and is expelled with pain and straining, and the presence of shivering followed by quick pulse, a haggard eye, great dulness, thirst, rapid emaciation and debility. The

urine is of a high color and scanty. There is tenderness on pressure on the belly, and the anus looks sore and red.

In the chronic form there is great emaciation, the skin is harsh and in bad condition, the feces are dark, tinged with blood and pus, discharged with pain and of a very foul odor. There is swelling about the jaws, ulcers around the anus, sinking in of the eyes, and increasing debility.

Treatment.—For acute dysentery, when seen early, the best treatment is to place the animal in a stall, give it soft, nourishing, well prepared food and fresh tepid water in moderate quantities, and administer by the mouth the following:—

No. 130.	Castor oil,	4 oz.
	Laudanum,	2 oz.
	Linseed oil,	1 pint.

For one dose.

Give several large injections of simple warm water by the rectum so as to wash out thoroughly the lower bowel. Gamgee's funnel (p. 43), is an excellent instrument for this purpose. The tail should be tied up and the quarters kept clean.

For this stage, Mr. Chawner recommends the following:—

No. 131.	Sulphuric ether,	
	Laudanum,	
	Tincture of catechu, each	1 oz.
	Linseed oil,	6 oz.

For one dose, followed by injections into the rectum of linseed tea.

But we should prefer to begin with a moderate anodyne purge given first (No. 73).

The chronic form is often very obstinate, as it may depend on a scrofulous or consumptive constitution. Careful dieting and nursing are indispensable. As for medicines, cod liver oil is the best.

No. 132.	Cod liver oil,	2 to 4 oz,
	Eggs,	4.

Mix in warm water and give twice a day.

A favorite prescription in both forms is:—

No. 133. Calomel, 10 gr.
Opium, 1 drachm.
Gentian,
Chalk, each 1 oz.

Make either into a ball or a drench, and give once a day.

If the feverish symptoms are not marked, the following answers a good purpose:—

No. 134. Powdered opium,
Powdered galls,
Sulphate of copper, each 1 drachm.

This may be repeated twice a day either for horses or cattle.

When there is much exhaustion, and the powers of life seem failing, a stimulant mixture is demanded, as:—

No. 135. Spirits of camphor, $\frac{7}{2}$ oz.
Sulphuric ether, $\frac{1}{2}$ oz.
Solution of acetate of ammonia, 6 oz.

Mix and give in gruel.

Ipecacuanha is used by many veterinarians in acute dysentery, as:—

No. 136. Powdered ipecac, 1 drachm.
Powdered opium, 20 gr.
Castor oil, 6 to 8 oz.

Give in arrow root water or boiled starch every six hours for three or four times at the outset of the attack.

Or the wine of ipecac may be used, as:

No. 137. Wine of ipecac,
Laudanum,
Solution of potash, each 1 oz.
Tincture of cantharides, $\frac{1}{2}$ oz.

Mix for a drench in a quart of warm gruel. This is recommended by Mr. Gamgee as a dose for an ox in long continued dysentery with weakness of the bowels.

In all cases of dysentery the straining and spasms of the rectum are exceedingly painful, and should be relieved by appropriate clysters. The two most effectual agents for this purpose are *opium* and *belladonna*:—

No. 138. Laudanum, 2 oz.
Boiled starch, 1 pint.

For a clyster; to be repeated every two hours until the straining ceases.

No. 139. Extract of belladonna, 2 drachms.
Chloroform, ½ oz.
Fresh milk, 1 pint.

Rub up the extract in the milk, add the chloroform, and throw up the rectum with a syringe.

CONGESTION AND INFLAMMATION OF THE LIVER — HEPATITIS — THE YELLOWS — JAUNDICE.

In horses and cattle liver diseases are not very common, and when they do occur are not easily recognized. They are usually of the forms known as congestion or torpidity of the liver, and inflammation of the organ and its covering, called in medicine "hepatitis" and "peri-hepatitis."

Causes.—The general cause is too rich food and too little exercise. Horses which are kept for pleasure, largely fed and little worked, while their stables are warm and dark, are apt to have their livers grow torpid. So also it is said that horses fed on the refuse of the malt house, a rich stimulating food, are particularly liable to the same trouble. It is more frequently met with in the southern than in the northern States, and more in cities than in the country.

Symptoms.—The horse is dull, inactive, has a heavy head, lustreless eye, and is dainty and capricious about his food. The dung balls are small and dark colored; the urine is scanty and dark; the pulse is faster than natural, and has a heavy beat. After a few days the whites of the eyes and the tongue turn yellow, there is tenderness on the right side over the liver when it is pressed upon, and sometimes there is lameness in the off shoulder.

More frequently the yellows do not show very decided symptoms. The eyes are of a dirty yellow color, the appe-

tite irregular, the animal spiritless, and in a generally unthrifty condition. The bowels are constipated, and there is some slight feverishness, the thermometer in the rectum showing about 101° degrees; the pulse is rather faster than natural.

Treatment.—The first step is to change the habits of the animal, by giving him different and laxative food of a plain character, plenty of cool, fresh air, and as he improves moderate and abundant exercise. Internally he may take:—

No. 140.	Iodide of potassium,	2 oz.
	Liquor potassae,	1 pint.

Two tablespoonfuls night and morning in a pint of water. (Chawner.)

Or the following, recommended by Prof. Gamgee:—

No. 141.	Oil of turpentine,	½ oz.
	Muriatic acid (diluted),	1 drachm.
	Powdered ginger,	2 drachms.

Mix in a decoction of oak bark, and give every two days.

Mercurials have long had a reputation in torpidity and congestion of the liver, and if used with moderation, and not continued long enough to salivate, there is no doubt of their usefulness. Proper formulas are:—

No. 142.	Calomel,	30 gr.
	Aloes, powdered,	1 drachm.
	Soap,	2 drachms.
	Rhubarb, powdered,	4 drachms.

Mix with syrup to make a ball, and give one twice a day until it purges moderately

No. 143.	Calomel,	1 drachm.
	Aloes,	2 drachms.

Mix with soap to a ball, and give one night and morning until it acts on the bowels.

Many prefer to give saline purges. These are much to be preferred in the ox and cow, but as before stated, they act in an uncertain manner on the horse, sometimes purging violently, sometimes having no effect. For horses the following is the best manner of giving salines for the yellows:—

No. 144. Sulphate of magnesia (Epsom salt),
Sulphate of soda (Glauber salt),
Common salt, each 1 lb.
Essence of ginger, 1 oz.

Mix these in a gallon of warm water and give about a pint once, twice or three times a day, until gentle and effectual purgation is established.

For cattle, the following similar mixture is recommended by Mr. Dun :—

No. 145. Sulphate of magnesia,
Common salt, each ½ lb.
Powdered ginger, 2 oz.

Mix in two quarts of water. and repeat daily until free evacuation is obtained.

Often for a torpid liver, dullness and general "biliousness" nothing succeeds so well as to begin with a brisk purge of aloes or salts, and follow it up by giving daily for a week the following :—

No. 146. Peruvian bark, 1 oz.
Powdered nux vomica, 1 drachm.

Mix into a ball with meal and molasses and give every morning.

INTESTINAL WORMS.

In the horse two kinds of intestinal worms are found (besides the bot worm, which is a temporary resident only and will be described elsewhere). They both belong to the genus *ascaris*, and are known as the round worm, which dwells in the intestines proper, and the thread worm which lives almost exclusively in the rectum. The former is not unlike the common earthworm in size; the latter is much smaller, and resembles in size and color a piece of white thread an inch or so long.

Symptoms.—These are not very distinctly pronounced. The coat is rough, the appetite irregular or craving, there is often itching about the anus, evinced by the desire to rub the hind quarters against walls, and there may be some emaciation.

When worms are suspected, it is advisable to give a purge and watch the feces. Should any parasites of either kind be found, it is appropriate to commence specific treatment.

Treatment.—As a vermifuge for the horse, Mr. Dun recommends:—

No. 147.	Calomel,	
	Oil of male fern,	
	Aloes, each	1 drachm.
	Ginger,	4 drachms.

Make into a ball with linseed meal and molasses.

Or,

No. 148.	Oil of turpentine,	2 oz.
	Oil of male fern,	1 drachm.
	Linseed oil,	½ pint.

Give after a purge and on an empty stomach. Follow it with a few daily doses of sulphate of copper.

Mr. Walsh believes that the most effectual of all vermifuges in the horse is tartar emetic. He prescribes it as follows:—

No. 149.	Tartar emetic,	1 drachm.
	Powdered ginger,	½ drachm.

Make into a ball with linseed meal. Give one every morning for a week on an empty stomach, and then follow with a purge of aloes.

After this he allows the horse to rest a week and then repeats the above, following the physic with a drachm of powdered sulphate of iron daily in the feed.

For thread worms the treatment should be by injections up the rectum. Of these we can select one of the following, all of them being destructive to the worms:—

No. 150.	Oil of turpentine,	2 drachms.
	Linseed oil,	1 pint.

Use every morning for a week.

No. 151.	Common salt,	½ oz.
	Carbolic acid,	½ drachm.
	Water,	1 pint.

Use every other day for a week.

A strong decoction of tansy, of wormwood or of almost any

vegetable bitter will also dislodge the worms. Tobacco tea is efficient, but dangerous.

Whatever injection is used it should be aided by a purgative dose, the best of which is :—

No. 152.	Sulphate of iron,	1 oz.
	Aloes.	4 oz.

Mix for a ball.

And also by cleanliness and smearing the anus with mercurial ointment, to kill the eggs of the worms.

THE BOTS.

Definition.—A diseased condition of the horse or ox produced by the irritation of the bot-fly or gad-fly, *Oestrus*, through its attacks on the skin and the presence of its larvæ in the intestines.

Causes.—The common gad-fly of the horse attacks him late in the summer, not for the purpose of living on his blood, but in order to deposit its eggs on his hair, and especially the hair of those parts of the body which the horse can reach with his mouth. When he licks his coat, the moisture and warmth of the saliva aid in hatching the eggs, and the small maggots within them are transferred to the mouth and next to the stomach and bowels of the horse, where they firmly fasten themselves by strong hooks with which their heads are provided. After attaining a certain period of growth they loosen their hold, are swept away with the feces and deposited on the ground, which they enter and then undergo the necessary transformations to become the perfect fly. In the form of bot-worm they usually pass the fall and winter in the horse's body, about eight months in all.

Symptoms.—Very many symptoms are attributed to the bots, and that occasionally, especially in underfed horses, they cause great general and local irritation, there is no

doubt. But it is not possible to point out any one single symptom which positively proves their presence.

They lead at times to colic, indigestion, irritation of the anus, and also to staggers, fits or convulsions, which, if they occur in winter without other assignable reason, in a horse somewhat out of condition, may fairly be laid to the charge of the bots. But probably in most instances, these parasites do no harm.

Treatment.—The preventive treatment is by cutting the hair close in those parts of the body which the gad-fly selects, and keeping it smeared in the late summer and early autumn with a tar or turpentine ointment. Internally, give a handful of fresh unbleached wood ashes once or twice a week in the feed.

To remove the bots when once lodged in the intestines, the following should be given on an empty stomach every morning, for three or four days:—

No. 153.	Powdered aloes,	
	Powdered assafœtida, of each	¼ oz.
Mix in hot water, and when cold add		
	Oil of turpentine,	
	Sulphuric ether, of each	1 oz.

Give in gruel and linseed tea as a drench.

This same is also a useful prescription for destroying tapeworm and other worms in horses.

Prof. Gamgee's prescription for bots, is:—

No. 154.	Powdered assafœtida,	2 drachms.
	Powdered savin,	
	Calomel, of each	1½ drachms.
	Oil of male shield fern,	30 drops.

Give as a ball, made up with molasses and linseed, at night, and follow with an aloes purge the next morning.

Still another plan is to give for three or four mornings a quarter of an ounce of sulphate of copper, made into a ball, and follow with a purgative dose of aloes, repeating this medication after a week's interval.

CHAPTER IV.

DISEASES OF THE HEART, BLOOD-VESSELS AND ABSORBENTS.

Palpitation—Violent Heart Beat—Thumps.
Enlargement or Hypertrophy of the Heart.
Fatty Degeneration of the Heart.
Aneurism—Enlargement of the Arteries.
Inflammation of the Jugular Vein—Phlebitis.
Inflammation of the Absorbent Vessels—Lymphangitis—Weed—Shot of Grease.

PALPITATION—VIOLENT HEART BEAT—THUMPS.

Definition.—A sudden, violent, convulsive beating of the heart, which may or may not be connected with some disease of the valves or substance of the organ.

Causes.—In the horse, this is most frequently seen in pampered, highly fed animals, or in those which have very irregular and violent exercise. Many horses when frightened or excited suffer from excessive heart beat, which to some extent lessens their capacity for work. If the palpitations are frequent and persistent, they indicate some serious disease of the heart. Indigestion and many blood diseases are accompanied by palpitations.

Symptoms.—The chief symptom is the increased violence of the heart's action. It can be readily felt, seen and heard. The pulse is irregular or intermittent. When owing to nervousness and temporary causes, this is usually visible in the excited eye, the rapid breathing, and in the quick diminution of the palpitation. But where there are not such signs of temporary excitement, the case is more serious as signifying organic disease of the heart, which is not curable.

Treatment.—Careful avoidance of sudden excitement and over-exertion are to be looked to in the first place. Full doses of digitalis, say ½ drachm of the powdered leaves, may be given twice a day in the food for several weeks. Indigestion and constipation must be prevented by appropriate treatment.

Frequently the digitalis may be combined with salines with advantage, as:—

No. 155.	Powdered digitalis leaves,	30 grains.
	Chlorate of potash,	½ oz.
	Or, nitrate of potash,	1 oz.

To be given once a day.

When the palpitation is associated with increased size of the heart, and a full and strong pulse, it is better to use aconite.

No. 156. Tincture of aconite root, 20 drops.

This amount may be used in the above prescription instead of the potash, or dropped in the drinking water twice a day.

Sometimes it is well, as Mr. Dun suggests, to begin with the aconite and when the force at the heart is reduced, to substitute for it the digitalis.

Another useful agent is belladonna. It may often, especially in cases where there is general debility, be advantageously given with nux vomica, as:—

No. 157.	Extract of belladonna,	1 drachm.
	Powdered nux vomica,	½ drachm.

Mix with liquorice powdered and molasses into a ball, and give once or twice a day for a considerable time.

ENLARGEMENT OR HYPERTROPHY OF THE HEART.

Causes.—Long continued overwork, constant indigestion, and diseases of the valves of the arteries lead to a growth of the heart much beyond its ordinary size, which should be considered an unsoundness. It also accompanies broken wind and other impediments of free breathing.

Symptoms.—There is more or less persistent palpitation, and the sounds of the heart are much louder than in health. Slight exertion increases these symptoms in a marked manner. The breathing is often hurried.

Treatment.—This condition is best combated by a moderate diet, and freedom from excitement, overwork and sudden exertion. Internally, the most effective remedy is *aconite*. This must be given in twenty or thirty drop doses (of the tincture of the root) twice a day, for a considerable time. When the enlargement is connected with broken wind or any similar impediment to the breathing, Prof. Williams recommends the prolonged use of small doses of *arsenic*, say three to five grains twice daily, in the food.

In hard worked and aged horses, hypertrophy of the left side of the heart is quite common. It can very generally be relieved by commencing the treatment with a few doses of aconite and then continuing with digitalis, as recommended under palpitation (p. 153).

FATTY DEGENERATION OF THE HEART.

Definition.—A change of the muscular substance of the heart to fat, thus weakening the strength of the organ and leading to rupture of its tissues.

Causes.—This is the most common change which takes place in the hearts of horses. It is generally due to advancing age, to high living and lack of exercise. It is also produced by other diseases, as purpura and scarlet fever.

Symptoms.—There is a gradually increasing debility of the circulation, as shown by the weak and irregular pulse, and the lessening of the sounds of the heart. The legs swell and become dropsical, and the horse gives out sooner when at work. The appetite becomes capricious, the lining membrane of the mouth and nose assumes a rusty red appear-

ance, and there is a want of correspondence between the beat of the heart and the stroke of the pulse.

Treatment.—It is doubtful if any treatment will arrest the disease. Prof. Williams recommends for trial, chlorate of potash, say one ounce, twice daily, with attention to the general health.

ANEURISM—ENLARGEMENT OF THE ARTERIES.

Definition.—A dilatation or expansion of a part of an artery, with thinning and weakening of its coats, and tending to burst into the surrounding tissue, thus forming a pulsating tumor containing blood.

Causes.—Generally aneurisms arise either from injuries, as a blow, a strain, a kick, a stab, or else from some change taking place in the coats of the artery, weakening it, as for example, fatty degeneration. This is most common in old horses who show signs of heart disease. Certain worms in the arteries (the so-called *Sclerostoma*) may also produce them in the horse.

Symptoms.—There is a visible tumor, which is soft and fluctuating to the feel, and which by steady pressure can be made to disappear or partly so, but reappears as soon as the pressure is removed. It is also felt to have a regular pulsation, like the beat of the heart.

Treatment.—This is not very successful. If the tumor is where it can be readily reached, steady pressure upon it by a pad and firm bandage for several days, may be successful in causing its disappearance. Some surgeons cut down upon it, tie the artery above and below, and then open the sack and turn out its contents.

The complaint constitutes an unsoundness, as it is generally a permanent injury to an animal.

INFLAMMATION OF THE JUGULAR VEIN—PHLEBITIS.

This generally occurs as a consequence on opening the vein for bleeding, either because the surgeon has used a rusty or dirty lancet, or that the horse has rubbed and injured the vein after the operation.

The inflammation may be confined to a small spot, or may extend up and down the vein, which will feel like a hard cord underneath the skin of the neck, which will be hot and inflamed to the touch, and evidently painful to the animal, especially on bending his neck.

Treatment.—The best treatment for this complaint is the application of a smart cantharides blister along the course of the inflamed part. If abscesses have formed, they must be opened and washed out with carbolic acid water (one ounce of carbolic acid to a pint of water), before the blister is applied. But after this is done, the blister should be applied as directed.

Inflammation of this vein always ends by transforming it into an impervious cord, so the recommendation is made that horses which have suffered from it should not be turned out to grass, as the dependent position of the head in grazing and the insufficient channels for the return of the blood from the head, bring on dropsical swellings of the face, lips and nostrils.

INFLAMMATION OF THE ABSORBENT VESSELS—LYMPHANGITIS—WEED—SHOT OF GREASE.

Definition.—By these various names is known a disease which commences by inflammation of the lymphatics, or absorbent vessels of the hind legs, the inflammation extending to the cellular tissue, becoming chronic, and producing permanent effusions and swelling of the limb.

Causes.—Weed is generally attributed to high feeding and

insufficient exercise ; or to over-feeding on green food, as fresh clover and rye grass; or to intestinal irritation of various kinds. Large coarse horses with thick legs are particularly subject to it.

Symptoms.—The attack is often preceded by disorders of the stomach, as colic, constipation, loss of appetite and excessive thirst. Sometimes chill and shivering usher it in. The first local indication is observed in one of the hind legs, generally the left. It is favored and held from the ground. On examining it, it is found swollen on its inner surface, the swelling sometimes extending from the body to the foot. There is heat of surface, tenderness to the touch, and sometimes the swollen glands can be felt like cords or lumps underneath the skin. The respirations and pulse are twice as fast as in health, the animal shows suffering in his face, and frequently turns his head to look at the affected limb. His nostrils are dilated and perspiration rolls from his side. The swelling increases until abscesses form, which will break internally and run along the limb unless freely lanced.

Horses that have once been attacked by weed are liable to a recurrence of the malady, time after time, until the limb assumes permanently an enlarged and distended condition, injuring both their appearance and their usefulness.

Treatment.—When seen in the early stages, when chill and shivering are prominent, the animal should be warmly clothed, and a moderate purge given, as :—

No. 158.	Powdered aloes,	4 drachms.
	Calomel,	1 drachm.

Mix and give at one dose in a ball.

Should the chill continue, Prof. Williams recommends the following as a powerful stimulant to the skin, inducing a general warmth over the whole surface of the body :

No. 159.	Tincture of arnica,	1 to 2 oz.

For one dose, mixed with warm water.

In the second or hot stage, bleeding is often performed, but it does no good and often is an injury. It is better treatment to foment the limb well with cloths wrung out in hot water, to keep the bowels loose, and give as a drink an ounce of saltpetre in a gallon of water two or three times a day. As soon as abscesses form, they must be freely opened with a sharp knife and dressed with cloths wrung out with carbolic acid water (an ounce of acid to the pint).

In the condition called "thick leg," which results from numerous attacks of weed, some veterinarians give large doses of veratrum viride. But this only succeeds where the swelling is largely dropsical and not in true weed. This is best managed by repeated rubbings with iodine ointment, by moderate diuretics and by alteratives, as:—

No. 160. Powdered resin,
Nitre, each — ½ oz.
Oil of juniper, — 10 drops.

Mix for a ball and give once a day.

Or with a tonic added:—

No. 161. Sulphate of iron, — 2 drachms.
Cream of tartar,
Flour of sulphur, each — ½ oz.

This in a ball or drench twice a day.

A stimulating mercurial ointment appropriate in such cases is:—

No. 162. Red iodide of mercury, — 1 drachm.
Lard, — 2 oz.

A piece the size of a walnut to be rubbed into the swellings every day.

CHAPTER V.

DISEASES OF THE KIDNEYS, BLADDER AND SEX ORGANS.

Inflammation of the Kidneys.
Inflammation of the Bladder.
Stone in the Bladder—Gravel.
Retention or Suppression of Urine—Strangury—Difficult or Painful Staleing.
Diabetes—Profuse Staleing.
Black Water in Horses—Hæmaturia—Azoturia.
Diseases of the Sex Organs; Contraction of the Sheath; External Inflammation of the Yard; Internal Inflammation of the Yard; Inflammation of the Vagina.

INFLAMMATION OF THE KIDNEYS.

This is a rare disease in the lower animals, being much less common than is usually supposed.

Causes.—It occasionally occurs from blows and strains; also from the irritation of gravel and kidney stones; and most frequently from the injudicious use of cantharides, turpentine and croton oil, which drugs have an irritating effect on the kidneys, to which some animals are very sensitive. Cold and wet are also causes.

Symptoms.—There is considerable fever with colicky pains; a hard frequent pulse, rapid breathing and increased thirst. The mouth is hot and the bowels constipated. There is generally a stiffness in the movements, with tenderness of the loins. The animal arches his back and walks with a straddling gait. With this there is a scanty secretion or a total suppression of the urine. The animal makes frequent efforts to stale, but succeeds in passing but a few drops of dark and reddish water.

Should the disease advance and this suppression continue for several days, the horse shows signs of intoxication, loses the control of his movements, or repeats the same movement over and over again; and death takes place from the blood poisoning.

Treatment.—If the animal is seen early and is strong and full blooded, a free bleeding at the outset will be of much service. This should be followed up by an active cathartic (for instance, No. 158), which may be aided and followed with advantage by repeated injections of tepid water. The loins should be wrapped in woollen cloths and kept fomented with warm digitalis tea, made by stirring a handful of the leaves into a bucket of boiling water. This remedy is highly recommended by Prof. Williams, in cases with obstinate suppression of urine. An excellent plan of fomenting in such cases is by a sheep skin wrung out of hot water or hot digitalis tea (p. 56).

Moderate diuretics are called for, but violent and irritating ones will be very hurtful. We may use:—

No. 163. Sweet spirits of nitre,
Solution of acetate of ammonia, each 2 oz.

Give in a quart of linseed tea or mucilage of slippery elm bark.

Or,

No. 164. Acetate of potash, 2 oz.
Powdered camphor, 2 drachms.

Rub the camphor with the yolks of two eggs, and mix this and the potash with two quarts of slippery elm mucilage, and give in two doses three hours apart.

INFLAMMATION OF THE BLADDER.

Causes.—This affection almost never attacks the lower animals, except from external violence or from the administration of irritating medicines, as croton oil or cantharides.

Symptoms.—Frequent passing of cloudy urine, the act being performed with evident pain and difficulty; fever and

tenderness on pressure over the bladder; frequently scouring with soft, bloody and fetid feces.

Treatment.—This should be by full doses of opium or morphia, the use of linseed tea, milk and whites of eggs beaten up with water as drinks. Belladonna is also useful:—

No. 165.	Extract of belladonna,	1 drachm.
	Sweet spirits of nitre,	1 oz.

Give in a drench with a quart of cold linseed tea.

The following is an old and standard remedy:—

No. 166.	Solution of potash,	1 oz.
	Extract of hyocyamus,	1 drachm.

Give as above, and repeat two or three times a day.

STONE IN THE BLADDER—GRAVEL.

Stone in the bladder and gravel are found in stallions, geldings and mares, as well as in the ox and cow. In these animals the hard concretions usually consist of carbonate of lime.

Causes.—Horses which from the nature of their work are compelled to hold their urine many hours at a time, as for instance hunters, are most liable to stone. The food and the water also have much to do with it. Some clovers, for example, form a large quantity of urine salts, and tend to the deposit of gravel; while hard water, which contains carbonate of lime in solution, predisposes to its accretion in the bladder.

Symptoms.—An early sign is some stiffness of motion in the hind limbs; unusual switching of the tail; a frequent desire to stale exhibited by the animal stretching himself out and drawing his yard, but passing little or no water. At other times the water flows with apparent ease for awhile, but suddenly stops, and the further attempts of the animal to empty his bladder are in vain. He will continue stretched

out for some time; and may groan, kick at his belly, and even lie down on account of the pain.

When these symptoms are observed, the attendant should "feel for the stone." This is to be done as follows: The rectum should be emptied by an injection of warm water, immediately after the horse has emptied his bladder. The hand of the operator is then to be well oiled and introduced into the rectum, and the bladder detected and examined. This can readily be done without the risk of any injury to the animal, and with the almost positive certainty of discovering the stone if it is there.

Treatment.—In the mare, even a large stone can be removed by dilating the urethra, the orifice of which is about four inches inside the vagina, and then introducing a forceps.

In the gelding or stallion, the surgeon has to extract it by the operation of "cutting for stone." It is not necessary to describe the steps of these manœuvres, as they require special instruments and a knowledge of anatomy, which only belong to a professional man.

The preventive measures are suggested by what has been said above about the causes of the complaint.

RETENTION OR SUPPRESSION OF URINE—STRANGURY—DIFFICULT OR PAINFUL STALEING.

When it is observed that a horse stales with difficulty or pain, the cause of this condition should be carefully inquired into, as it may be of a serious nature, requiring prompt attention to save the animal's life.

It may arise from

1. Palsy of the bladder, following an injury, meningitis, lockjaw, staggers, severe colic or other acute disease.

2. Disease of the parts, as spasm or inflammation of the neck of the bladder, stricture of the urethra, enlargement of

the prostate gland in old male horses, cancer, stone in the bladder, accumulation of dirt in the sheath and excessive constipation.

3. Irritating drugs, especially cantharides and turpentine, used carelessly, or sometimes when cautiously used in horses of a peculiar sensitiveness to their influence. This form is called "strangury," and is characterized by the frequent efforts to stale, but the passage of only a few drops at a time.

Treatment.—When it appears that the suppression is owing to palsy, the urine must be drawn off with a catheter several times a day, and the treatment recommended under paralysis promptly resorted to, especially the injection of strychnine under the skin.

If it is due to inflammation of the neck of the bladder, as indicated by the heat, swelling and tenderness of the part, and the general feverish symptoms, general bleeding may be resorted to, and injections of warm water containing one drachm of extract of belladonna to the quart must be thrown repeatedly up the rectum, or, in mares, up the vagina. Full doses of opium may be given to relieve pain.

Spasm of the neck of the bladder may be overcome by the use of the same injection.

Accumulation of hardened feces in the rectum requires frequent and full injections of soap and water, supplemented, if necessary, by back-raking the animal. Cancer, stone and enlargement of the prostate are practically incurable, and a horse so affected might as well be killed.

If due to general weakness of the bladder, the following stimulant may be given :—

No. 167.	Powdered cantharides,	20 grains.
	Powdered digitalis,	1 drachm.

Mix with soap into a ball.

Of a more soothing and gentle action is this one :—

No. 168.	Powdered camphor,	2 drachms.
	Saltpetre,	½ oz.

Mix into a ball.

In strangury from cantharides or turpentine, the loins are to be fomented with the sheep skin wrung out in hot water, the vagina or rectum filled with an injection of starch and laudanum or belladonna (Nos. 138, 139), and internally the following drench prescribed :—

No. 169. Powdered camphor, 1 drachm.
Powdered opium, 2 drachms.

Mix in a quart of linseed tea or slippery elm water, and repeat every hour until relieved.

DIABETES—PROFUSE STALEING.

Definition.—A disease characterized by great thirst, and excessive discharge of urine, progressing toward loss of flesh, weakness, and exhaustion, sometimes leading to farcy, glanders, and a general break down of the system.

Causes.—By some writers it is attributed to faulty feeding of various kinds, or to the use of drugs which over-stimulate and irritate the kidneys. It is believed that hay which has been heated in curing or is musty, damp and mouldy oats, and half spoiled bran are liable to bring it on. Habitual feeding on boiled food is a common cause, and sometimes it appears to arise from some contagious poison, as when glanders is prevalent, horses are particularly liable to it.

Symptoms.—The main ones are the inordinate thirst and the corresponding unusual staleing. The appetite generally fails, the skin becomes harsh and dry, and the animal loses flesh and strength. The pulse is weak, sometimes slower sometimes faster than natural. The horse shows a depraved appetite, licking the walls and floor of his stall. The urine discharged is as clear as water, and with little or no odor. It often amounts in quantity to 20 to 40 pints daily.

Treatment.—The first attention will be to the diet, which should be completely changed. Then a mild laxative may

be given, say a pint of linseed oil, and a tablespoonful or two of powdered chalk or baking soda be mixed with the pail of drink. For the cure we rely on *iodine*, which was first discovered by the English veterinarian, Professor Dick, to be almost a specific in this disease. A convenient formula is:

No. 170.	Iodine,	20 grains.
	Iodide of potassium,	1 drachm.
	Carbonate of soda,	4 drachms.

This dose to be given three times a day in water.

Or, as recommended by Mr. Chawner, we may give:—

No. 171.	Fowler's solution of arsenic,	1 oz.

This amount in a pint of water morning and evening.

The formula preferred by Mr. Finlay Dun is:—

No. 172.	Iodine,	½ drachm.
	Sulphate of iron,	2 drachms.
	Powdered gentian,	½ oz.

Make into a ball with molasses, syrup or meal and water.

This dose is to be given once, or in bad cases, twice daily; rarely are more than six doses required to effect a perfect cure.

Other receipts of service in various instances are:—

No. 173.	Iodide of potash,	6 drachms.
	Alum, powdered,	½ oz.

Mix into twelve balls, and give one morning and evening.

No. 174.	Creasote,	½ drachm.
	Vinegar,	3 oz.

Give daily in a pint of water.

BLACK WATER OF HORSES—HÆMATURIA—AZOTURIA.

Definition.—A disease of the general system, characterized by a large excess of urea in the blood, by urine of a dark coffee color, and by spasms of the muscles of the hind quarters.

This is not a common disease, and its exact nature is as yet open to question. It attacks both horses and mares, but es-

pecially the latter during the period of heat. The color of the urine was supposed by Prof. Gamgee to be owing to blood; but Prof. Williams found no blood corpuscles whatever in the urine, but nitrate of urea and hippuric acid in excess. Mr. Haycock called it the "hysteria of mares," but it is by no means confined to the female sex.

Causes.—Its exciting causes are the period of heat; sudden exertion after a long rest in the stable; congestion and torpidity of the lungs and liver.

Symptoms.—The attack begins suddenly. The horse is unusually restless, sweats profusely, and inclines to lie down. Shortly a loss of power in the hind limbs is observed, their larger muscles are seized with violent spasms, sometimes involving the shoulders. The pulse and respiration are very rapid. There is soon entire paralysis or great stiffening of the hind quarters. With these symptoms, large quantities of a dark urine, looking like coffee, are ejected. The breathing grows difficult, symptoms of general spasms resembling tetanus supervene, and the horse dies.

Sometimes it attacks several horses in the same stable, but there is nothing whatever contagious in it. The duration of the disease is brief, three or four days either destroying the animal or the symptoms passing off.

Treatment.—The animal should be placed in a large stable with abundant bedding; if he lies down paralyzed, he is to be turned over several times a day.

The first step is to obtain a free action of the bowels. For this purpose the following, which also acts on the kidneys, is appropriate:—

No. 177.	Powdered aloes,	4 to 6 drachms.
	Cream of tartar,	1 to 2 oz.

Mix in a pint or two of warm water.

This should be repeated if it does not act in five to six hours. Meanwhile an active clyster is to be thrown up the

rectum, as a quart of soap and water with four ounces of oil of turpentine. Cold water should be allowed in any quantity.

No stimulants and no sedatives are to be administered, no blisters, firing or bleeding.

When the violence of the disease is overcome, it requires some persuasion to get the horse on his legs. He will continue to lie when it is quite possible for him to stand, and this must be prevented by lifting him on his feet, briskly rubbing the legs, and if need be, supporting him by the slings. Now is the time when a nerve and general tonic is required, and we would select this one:—

No. 176.	Sulphate of iron,	2 drachms.
	Powdered nux vomica,	1 drachm.

Give as a ball three times day.

Complete rest, a rather low and plain diet, and abundance of air in a yard or field are required for several weeks, as relapses occasionally occur from too early use.

DISEASES OF THE SEX ORGANS.

The sex organs in the horse are subject to contagious as well as occasional diseases. It has been definitely shown that a disease identical with syphilis is propagated by copulation. Many instances are recorded on the continent of Europe, but we have heard of none in this country; so we shall not enter into its description, but confine ourselves to the disorders of common occurrence.

1. *Contractions of the Sheath.*

These are generally contractions, either in front of the yard, thus impeding the escape of the urine, or behind its extremity, so that the yard cannot be withdrawn into the sheath (phimosis and para-phimosis).

In both these cases the free use of cold water on the sheath will diminish any inflammation present; and then by wiping dry and oiling the parts well, careful manipulation will overcome the difficulty. When this fails, an incision may be made to relieve the constriction. The bleeding thus caused will be a benefit.

When the paraphimosis is the result of paralysis, as is sometimes seen in old geldings, the case is incurable, and the only resort is amputation of the organ.

2. *External Inflammation of the Yard.*

Inflammation of the end of the yard is very common, being brought on by the presence of irritating substances, as the natural secretions when decomposed, or some foreign body.

At first there is a slight discharge of whitish or yellowish matter, which is followed by ulcers on the yard and sheath, usually emitting a decidedly unpleasant peculiar odor. They may fill up with proud flesh and cause great pain and unsightly swelling.

Proper attention will always prevent this trouble. And when it is present, we must give it careful attention, for it is no easy matter to bring about cure when in a neglected state.

The parts must first of all be well cleansed, by syringing with warm water and soap, or by a weak carbolic acid solution (one drachm to a quart of warm water). The following solution should then be wrapped on the parts, or syringed into the sheath:—

No. 177.	Chlorate of zinc,	2 drachms.
	Water,	1 pint.

This is a powerful caustic solution, and its application will be severely painful. But milder ones will not prove effectual. It must be repeated every day until the granulations are reduced and the part has taken on healthy action.

3 *Internal Inflammation of the Yard.*

This occurs in the gelding as well as in the stallion: in the latter, generally from too frequent service; in the former, from the use of cantharides, croton oil or turpentine, or from the presence of foreign bodies in the urethra.

The symptoms are, a frequent desire to urinate, the act performed with difficulty; frequent extension of the organ; and a discharge of a whitish or yellowish matter from the urethra.

The treatment is to foment the parts with hot water (the hot sheep skin), to administer a moderately brisk purge, and to give the animal freely of bi-carbonate of soda, an ounce in water several times a day. These means failing, an ulcer in the urethra may be suspected. The horse must then be cast, the parts inside the urethra examined, and any ulcerated surfaces touched with nitrate of silver, and injections of weak sulphate of zinc solutions, one-half to one drachm to the pint of water, to be made.

4. *Inflammation of the Vagina.*

This is a rare disease in the mare. When it occurs, it is usually due to violence of the stallion when serving; to difficult labor; to the presence of cancers and ulcers; or to local violence, as by inserting a stick or cob into the vagina, an insensate piece of mischief not so rare as it ought to be.

The inflammation shows itself by a swelling and tenderness of the parts, and by a discharge of a watery or purulent matter.

In the treatment the principal precaution to observe is not to irritate further the parts by strong injections. Linseed tea or slippery elm bark mucilage, made warm, and containing a drachm of sugar of lead to the pint, are the best injections which can be used in most cases. If the discharge is foul, sulphate of zinc may be used instead of the lead.

CHAPTER VI.

DISEASES OF THE BLOOD, OR GENERAL DISEASES.

Glanders.
Farcy—Bud Farcy—Button Farcy.
Charbon in the Horse—Purpura Hemorrhagica—Spotted Fever.
Rheumatism.
Strangles—Colt Distemper.
Erysipelas—St. Anthony's Fire.
Dropsy—Ascites.

GLANDERS.

Definition.—A contagious and fatal disease, due to a poison taken into or generated in the system, which shows its presence by a discharge from the nostrils, and a degeneration more or less rapid of the lymphatic glands and ducts. The poison can be conveyed to man, in whom it produces fatal illness.

Causes.—The causes of this common and formidable disease, apart from contagion, are usually said to include everything that exhausts and reduces the vital powers, such as bad feeding, over-work, neglect, foul air and filthy stables. It is also liable to be generated by putting horses into new stables whose walls are not dry; and it is a frequent sequel of diabetes, influenza, the epizootic disease, and other exhausting complaints.

As caused by contagion, it is very justly the most dreaded of all diseases of horses, as it is easily inoculated into the human species, and is just as incurable as in the horse. In the latter, however, inoculation is not necessary, as the poison is disseminated by more subtle means. Sometimes stables

which have liveried glandered horses have been thoroughly cleansed, aired and whitewashed; yet a new and healthy set of horses being placed in the stalls, one or more of them would be down with the glanders in a few weeks.

Symptoms.—Glanders occurs in two forms, the acute and the chronic.

Acute glanders appears suddenly by prolonged chills and shiverings. As they pass off a high fever sets in; the temperature running up to 106 or 107 degrees. The pulse is feeble and rapid, the breathing quick, and the appetite fails. The eyes are weak and watery, and the glands under the jaw are swollen. On examining the nostrils, their lining membrane is found to be swollen and of a dark coppery or red color, with patches of ragged ulceration here and there, from which drips a bloody and watery discharge. The swollen glands of the face and neck soon break and form abscesses with a similar sanious pus coming from them. The animal rapidly weakens, the breathing becomes obstructed, the lungs become inflamed, and death ends the scene.

Chronic glanders presents this same history in a much slower and apparently milder, but in reality none the less fatal form. The general health may seem to be scarcely affected. There will be a discharge, often from one nostril, usually the near one, of a thin, sticky fluid, which has not a very unpleasant odor, sometimes no odor at all, and which dries and accumulates around the nasal opening. On feeling beneath the jaw, the swollen glands will be felt like a hard knot, which may, however, disappear for a time to return again. The membrane of the nostril will prove to have a tawny, coppery or dull leaden hue. The eye of the affected side will be weak and watery.

Usually the symptoms are more decided than this. The horse is off his feed, his coat is unhealthy, he has a slight cough, and sweats on slight exertion. There is a discharge

of a starchy or gluey matter from one or both nostrils, often tinged with blood. The lining membrane of the nose is studded with small deep ulcers, and between the ulcers covered with unhealthy looking pimples. The eye of the affected side is weak and watery. A distinct tumor can be felt below the jaw, sometimes forming an abscess discharging an unhealthy pus. If well taken care of, a horse may live in this condition for a year or two and do moderate work; but he is liable at any time to be carried off by an acute attack of the disease, and he is constantly an object of great danger, not only to other individuals of his own species, but to every person who comes near him.

Between the time of receiving the contagion into the system and the appearance of the disease, there usually elapses in the acute form but three to six days; while in the chronic form it may be two or three months.

Treatment.—Some of the best authorities recommend that no treatment be attempted in glanders. It is considered more desirable for the animal and his attendants that he be killed as soon as the nature of the disease is recognized. A positive law to this effect exists in England, and it might be well if it were adopted by all the States in this country.

A vast number of remedies and receipts have been suggested and various cures have been reported. They should be accepted with hesitation, as it is quite likely that a nasal gleet of some kind was mistaken for glanders. We shall give several prescriptions which have had the most said in their favor, but our general advice is, as already given, to kill every glandered horse as soon as he is determined to be so.

Sulphate of copper and arsenic have had the most said in their favor. They may be given alone or combined, as:—

No. 178.	Sulphate of copper,	1 drachm.
	Peruvian bark,	1 oz.

Mix for a ball.

No. 179. Sulphate of copper, 1 drachm.
Arsenic, 8 grains.
Mix with linseed meal and syrup to a ball.

No. 180. Sulphate of copper, 1 drachm.
Corrosive sublimate, 8 grains.
Mix as above for a dose.

No. 181. Syrup of the iodide of iron, ½ oz.
To be given twice a day.

This latter is certainly effectual in curing many obstinate nasal gleets which have been called glanders.

Whatever medicine is used, a full and nutritious diet, moderate work, and a clean, well aired stable, with thorough disinfection are all indispensable to success.

FARCY—BUD FARCY—BUTTON FARCY.

Definition.—A contagious and malignant disease, characterized by swelling and ulceration of the lymphatic glands beneath the skin, and believed to arise from the same blood poison which causes glanders.

Causes.—The most common cause is direct inoculation of glanders or farcy poison; but the infection may also be propagated through the air; and the disease may appear spontaneously after exhausting disease or in old age. It is considered certain that the same poison produces both glanders and farcy, and that the only difference in the diseases is in the part of the system attacked.

Symptoms.—Farcy, like glanders, is divided into an acute and chronic form.

In acute farcy the early signs are shiverings, fever, loss of appetite and swelling of the legs. The whole limb becomes enlarged, resembling that in weed (p. 157), but presenting an uneven surface, increasing and decreasing suddenly, and attended with pain and lameness. When the swelling lessens, the enlarged glands can be felt under the skin forming cords

and small rounded lumps, which latter are the so-called "farcy buds." These in a little while point and burst through the skin, discharging an unhealthy pus. They are usually found in groups, and are situated at some distance from the joints. Frequently the inside of the thighs will be found to present hard and painful swellings; the muscles of the neck may be hard and painful; or the swelling may be in the side or in one leg; thus leading perhaps to the suspicion of rheumatism.

In chronic farcy, the principal difference is that the buds and hard cords connecting them are distinctly felt and are evidently tender and painful, but they rarely pass into ulceration. The buds or buttons are arranged in groups about the inner and outer aspects of the thigh, forearm, flanks, neck and head. Sometimes they may be felt along the course of the jugular vein, presenting swollen, hard and irregular knots.

Treatment.—A horse with acute farcy should be forthwith killed. He is as dangerous as one with glanders. The milder cases of chronic farcy offer some chance of a cure. The swellings may often be dispersed by blistering them, or by rubbing them with ointment of the biniodide of mercury, or what is handier, with a stick of lunar caustic. If there are running sores, they must be frequently washed with a ten per cent. solution of carbolic acid. The strength must be supported by nourishing food and tonics. Prof. Williams recommends:—

No. 182. Arsenic, 5 grains.
Extract of nux vomica, 1 drachm.
For a drench in a pint of water twice a day.

He also speaks well of:—

No. 183. Sulphate of copper,
Iodine, of each 1 drachm.
This amount in a pint of water twice daily.

Cases of farcy and nasal gleet, with enlarged glands and a fetid discharge, are sometimes benefitted, according to Mr. Dun, by the following:—

No. 184.	Creasote,	1 drachm.
	Sulphuric acid (dilute),	30 drops.

Make into a ball with linseed meal, and give every morning.

For a dressing for farcy buds, Mr. Dun recommends the ointment of iodide of mercury (No. 162).

As a tonic ball in this disease, Mr. Gamgee uses this combination:—

No. 185.	Sulphate of copper,	
	Sulphate of zinc, each	½ drachm.
	Aniseed,	3 drachms.

Make into a ball with common mass, and give once a day.

As an ointment for dressing the buds, we may use

No. 186.	Corrosive sublimate,	1 drachm.
	Arsenic,	½ drachm.
	Lard,	1 oz.

This is a strong stimulant, and must be used in small quantities and cautiously.

A useful soothing application is:—

No. 187.	Bromide of potassium,	2 drachms.
	Lard,	1 oz.

Mix at gentle heat and rub on the buds.

CHARBON IN THE HORSE—PURPURA HEMORRHAGICA—SPOTTED FEVER

Definition.—A malignant epidemic fever, arising from blood poisoning, usually attacking old and debilitated subjects, characterized by deposits of dark red or purple color, passing into ulceration.

The name *purpura* should not be applied to this disease, as it is widely different from that complaint as it appears in the human subject. Professor Blaine calls it "malignant typhus," and it certainly resembles that disease, as much as any other in man. It is in all probability a form of true

charbonous or anthracose disease, but is much less fatal in horses than in cattle, sheep or swine, and presents various other marked differences.

Causes.—Purpura is found in old and broken down animals, and is especially apt to arise at the close of exhausting diseases, as pneumonia, influenza, the epizootic, catarrhal fever, etc. Its direct cause is nearly always from bad ventilation, imperfect drainage, and neglect of sanitary precautions. When such precautions are properly taken, purpura is scarcely ever seen. The absorption of the products of decomposition into the body leads to a change in the blood, rendering it fluid, and destroying its vitality, so that the walls of the vessels soften and break down, and the blood flows into the surrounding tissues, causing the dark spots characteristic of the disease.

Symptoms.—The animal is weak, languid and unwilling to move. On examining his mouth, spots of a dard red or mulberry color are visible on its lining membrane. The tongue has a peculiar dark claret color. Sometimes there is an oozing of blood from the nose and mouth, dark in color and fetid in odor. There is swelling of the legs, lips and other dependent parts, of a peculiar character; it extends perhaps the whole length of the limb, and ends at its upper border very abruptly, as if a string had been tied around the part. The swelling is painful, hot and hard. Around the hock and fetlock joints small vesicles or blisters about the size of a pea appear, which burst and discharge a scalding fluid; and around the bend of the limbs cracks, and fissures are formed, from which an unhealthy purple colored discharge flows. Great swelling of the face, lips, nostrils and eyelids sometimes occurs. The skin over the swelling may ulcerate, causing unhealthy sores.

The bowels are either constipated or there is diarrhœa. Colicky pains are apt to come on, and the feces to be mixed

with blood. The urine is dark colored and has a strong smell.

The more severe symptoms are remittent in their character; they may appear very threatening one day, seem almost gone the next day, but return with the same or greater violence. Therefore the physician should be cautious how he pronounces the animal decidedly better.

Treatment.—It is of first importance to remove the animal to a clean, well drained, well ventilated stable. Purgatives are dangerous and bleeding as good as fatal. What is wanted is to relieve the bowels when there is constipation or irritation by a free injection or by a moderate dose of oil; and to administer something which will check the action of the poison on the system. The most successful of all drugs for this purpose is *chlorate of potash*, for the discovery of the application of which in this disease we have to thank Prof. Williams. He gives half an ounce at a dose, and repeats it twice in the twenty-four hours. A larger dose must not be given, as it is liable to cause irritation of the bowels. Under this medicine the results are most satisfactory; the swellings rapidly diminish, and restoration to health ensues, in the great majority of cases.

The treatment preferred by Mr. Chawner is one to act on the kidneys and keep up the strength. He prescribes:—

No. 188. Solution of acetate of ammonia, 2 oz.
Oil of turpentine,
Tincture of chloride of iron, each 1 oz.
This amount, in a pint of gruel, three or four times a day.

Or instead of this:—

No. 189. Sulphate of iron,
Powdered gentian,
Powdered camphor,
Nitrate of potash, each 2 oz.
For one ball, to be given night and morning.

The swollen parts may be bathed with vinegar and water,

and if the swelling becomes excessive, may be freely scarified with the lancet.

The convalescence in this disease is often very prolonged, and the owner must make up his mind to do without the use of the animal many weeks if he would see him recover to advantage. As a valuable internal stimulant in this and similar low fevers, Mr. Gamgee speaks highly of mustard :—

No. 190. Powdered mustard seed,
Powdered juniper berries,
Flowers of sulphur, each 6 oz.

This to be added to a quarter peck of oat meal, and three or four tablespoonfuls given several times a day.

The same authority has derived advantage from the mineral acids in conditions of exhaustion, as—

No. 191. Muriatic acid,
Or sulphuric acid, of either 30 drops.
Water, 1 oz.

Give three times a day, in a pint of ale.

RHEUMATISM.

Definition.—An inflammation of the joints, tendons, ligaments or muscles, due to an unhealthy condition of the blood, accompanied by stiffness and lameness. The inflammation changes its seat from one part of the body to another, and very rarely passes into suppuration.

Causes.—In animals it may occasionally arise, in weak and old subjects, from exposure to cold and damp, but usually follows or accompanies catarrhs, colds, influenza or other disorders. It appears in some instances to be hereditary, and to arise from a natural predisposition.

Symptoms.—The two forms of rheumatism are the acute and the chronic.

Acute rheumatism, sometimes called rheumatic fever, begins with sudden lameness, with or without swelling of some particular joint. There are signs of fever, indicated by

dullness, quickened pulse, hot skin, often perspiring (but not with the sour smell noticed in the disease in man), and thirst. The appetite is poor, the bowels generally constipated, the urine high colored and scanty. Very often the lameness will be in the joints on both sides of the body. Quite frequently it rapidly changes its seat, passing from one joint to another and back again to its first seat. It is confined to no particular part, and may pass from the legs to the neck, causing a stiffness of the neck, commonly known as "the chords," or "the cords;" or to the back, when it is called "lumbago;" or to the heart, leading to inflammation of its envelope, or "pericarditis," always a dangerous complication. When in the joints, it produces a considerable swelling, soft and puffy, tender to the touch, and slow to disappear.

Chronic rheumatism is not so liable to change its seat. It attacks a joint and brings about grave changes in its structure, such as ulceration of the cartilage and increase of bony deposit around it. The lameness so produced is obstinate to treatment, and the tendency of the disease to return on the slightest exposure is very great. Fever is generally entirely absent in chronic rheumatism, and the general condition of the animal may remain quite good.

Treatment.—In the treatment of acute rheumatism the most important discovery of modern times is the use of *salicylic acid.* This, if given early and freely, and backed by proper nursing and care, will cut short nearly every case. The following is a proper formula:—

No. 192. Salicylic acid,
Bicarbonate of soda, each 1 oz.
Mix in a pint of water or gruel, and give as a drench, three or four times a day.

The body should be well wrapped, the stable kept at a moderate temperature, and if necessary, the slings should be applied. If there is much constipation it is usually custom-

ary to give a purge, but it is doubtful whether this does any good. Bleeding is of no benefit whatever.

When the salicylic acid is not at hand, the next best remedy is nitrate of potash (saltpetre). This may be freely administered, by dissolving two or three ounces daily in the water. Or it may be combined as recommended by Mr. Chawner, in the following prescription:—

No. 193. Nitrate of potash, ½ oz.
Powdered colchicum, 1 drachm.
Oil of turpentine, 1 oz.

This to be mixed with linseed oil and given at one dose, night and morning.

Blisters to the inflamed parts are very useful in reducing the swelling.

Mr. Finlay Dun has relieved rheumatism in both horses and cattle by—

No. 194. Calomel,
Quinine, of each 20 grains.

Give as a ball once a day.

In the more chronic forms, the same writer recommends:—

No. 195. Carbonate of potash,
Nitrate of potash, each 1 oz.
Iodide of potash, 2 drachms.

Give in a pint or two of water.

Where the horse is stiffened and partially paralyzed by repeated attacks, but when there is no actual deformity of the joints, very great benefit may be occasionally obtained by giving—

No. 196. Powdered nux vomica, 1 to 2 drachms.
Gentian, ½ oz.

Give night and morning, beginning with the smaller dose and increasing. The joints and muscles to be well rubbed with a stimulating liniment.

The local treatment of rheumatic swellings and stiffening of the joints is by liniments and embrocations, firing and setons.

Of useful liniments we give the following:—

No. 197. Oil of turpentine,
Laudanum,
Soap liniment, each 1 oz.
Tincture of capsicum, 1 drachm.

This is a soothing and stimulating embrocation.

No. 198. Solution of ammonia,
Spirits of camphor,
Olive oil, equal parts.

Petroleum or kerosene, well rubbed in, is both often of great service, and some recommend giving kerosene by the mouth, in doses of two or three tablespoonfuls in a pint of gruel.

One of the best of local applications in the form of an ointment is the *oleate of mercury*, made by heating oleic acid with red precipitate. It is remarkably penetrating, and not at all likely to salivate.

STRANGLES—COLT DISTEMPER.

Definition.—A disease of the system, accompanied by fever, generally attacking young horses, associated with swelling of the glands beneath the jaw, and sometimes elsewhere, with a tendency to suppuration. It has been called by Mr. George Armitage "specific adenitis."

Causes.—The cause of strangles is not known. Veterinarians are not even agreed as to whether it is contagious or not; nor as to whether a horse can have it twice or not. The best authorities incline to the opinion that it is not contagious, and that some horses are liable to have it several times. Though generally appearing in horses from a few months to six years old, it is not confined to any age. It has at times been considered an epizootic influenza, but it differs essentially from the disease we described as such on page 109.

Symptoms.—The attacks differ considerably in severity, the graver forms being called "bastard strangles."

Usually it begins like a common cold. The animal is dull, has a slight cough and sore throat, loss of appetite and unwillingness to swallow. There is some running from the nose and mouth, a quickened pulse and rapid breathing. On feeling in the space within the lower jaw bone, a hot and tender swelling will be noticed, sometimes on one side only, sometimes filling up the whole space.

At other times, for weeks or months before there is any positive sign of disease, the animal is unthrifty, hide bound, dull, easily chilled, with a slight cough, and losing flesh. In this condition he is often said to be "breeding strangles," an opinion verified finally by the appearance of the characteristic swelling under the chin.

A more alarming mode of onset is when the swelling is sudden and great, filling up the mouth and bringing on those symptoms of strangulation from which the disease derives its name. There is great difficulty of breathing, accompanied by a loud blowing sound. The animal is in great distress, and unless promptly relieved is liable to die from suffocation.

Any of these forms may terminate in bastard strangles, which is when the disease passes into a typhoid condition, with great exhaustion, extensive suppuration in various parts of the body, and exhausting discharges.

Treatment.—In a light attack of strangles it is enough to give the animal good nursing, apply a large poultice or hot fomentations to the swollen glands, and put an ounce of saltpetre in the water pail, night and morning.

If the tumor points and bursts, it may be poulticed and left to itself; but if it seems slow to do this, and does not diminish, it is best to put on a fly blister, to "bring it to a head" promptly. It may then be opened with a lance.

Where a horse is suspected of "breeding strangles," he

should be well stabled and fed on extra good nourishment, as this variety of disease is most apt to be followed by dangerous internal symptoms. Neither in it nor in any other form of the complaint should bleeding, purging or lowering medicines, like aconite, digitalis, veratrum or lobelia, be used. If there is danger of strangling, from the rapid growth of the swelling, we may try very hot fomentations and poultices to the throat, making the animal inhale steam, and opening the abscess freely as soon as it "points." But it will not do to waste time with these measures in desperate cases. There is then one only step to take, and that is to open the windpipe at once, by the operation known as "tracheotomy." This is to be performed in the following manner:—

Have an assistant, elevate the horse's head and extend his nose so as to put the skin of the throat on the stretch; then feel along the course of the windpipe for the part least covered with flesh and fat, and make a bold incision down its central line, about four inches long, through the skin and down to the rings of the windpipe. When this is done, introduce the point of a sharp-pointed knife between the upper exposed rings, and cutting downward, divide two or three of them completely across from above downward and in the middle line of the neck. Introduce the tube into this opening, and fasten its strings around the neck and to the mane. It should be kept in until the animal is able to breathe through the nostrils, which can be readily ascertained by closing the tube with the hand from time to time.

When the swelling is languid and does not "come to a head," it should be stimulated by painting it with tincture of iodine, or friction with iodine ointment (No. 8). Should this not affect the swelling promptly, a blister should be applied to the part.

When the ulcers which remain after the abscess breaks are not disposed to heal, they must be touched with the stick of

nitrate of silver, with dilute nitric acid, or dressed with resin cerate, or the following :—

No 199. Iodide of mercury, 1 drachm.
Lard, 1 oz.
To use as a dressing spread on soft leather or linen.

No. 200. Creasote, 1 or 2 parts.
Lard, 8 parts.
Use as the last.

Tonics are quite important in these cases, to hasten the healing of the ulcers and improve the general strength, as :—

No. 201. Sulphate of iron,
Ginger, each 4 oz.
Mix with enough common mass to make ten balls, and give one twice a day.

Cod-liver oil internally, in doses of 3 or 4 ounces, also greatly aids in convalescence. Many sluggish cases are owing to a scrofulous taint in the system, according to Prof. Gamgee, and for such nothing could be better than—

No. 202. Cod-liver oil, 2 oz.
Iodine, 20 grains.
Mix with a pint of fresh milk and give on an empty stomach. twice a day.

One of the late writers on this disease, Mr. George Armitage (in the *Highland Soc. Agric. Report*, 1878), justly says that the whole treatment consists "in the production of the discharge of the abscess." It is possible, by biniodide of mercury ointment, to disperse it. But nearly always this is followed by the sudden death of the animal, through some obscure form of blood poisoning. It would appear that there is some specific poison which requires to find an exit from the body by the discharge of the contents of the abscess externally.

ERYSIPELAS—ST. ANTHONY'S FIRE.

Definition.—An inflammation of the skin and tissues beneath, owing to a blood poison, characterized by a swelling and hardness of the affected parts, which has a tendency to spread and form abscesses.

Cause.—This is supposed to be, primarily, some alteration in the blood. In horses and cattle erysipelas is nearly always the result of wounds, and generally of those in the legs of animals weakened by hard work and poor food, or else in young animals whose blood is vitiated by the poison of glanders or some other animal contamination.

Symptoms.—Generally on the third or fourth day after receiving the injury the skin in the immediate neighborhood of the wound is found swollen, smooth, shining, hot, tender and painful. The swelling gradually extends around it, and sometimes deep into the muscles. The surface is hard and tense, but often when the finger is firmly pressed upon it and withdrawn, a little pit or depression is left. Blisters on the surface and abscesses beneath the skin are frequently seen.

The general symptoms correspond with the severity of the local disease. In the lighter form the animal is fevered, loses appetite, and is lame in the affected limb. In severe cases there are severe chills, the pulse is weak and quick, the breathing hurried, the bowels constipated, and the urine scanty and high colored. There is no appetite, but excessive thirst.

All the signs of a low typhoid state may follow, the abscesses burrowing deeply between muscles and into joints, and the animal dying of exhaustion.

Treatment.—In all cases begin with a brisk purge, aided by injections if it does not act promptly. It is important to

stimulate the bowels decidedly. If there is much fever, add 20 drops of tincture of aconite root to the water every few hours; Prof. Williams justly remarks that this drug has a most marked effect in allaying the irritation and fever in this disease.

As soon as the bowels have freely acted, prepare the following:—

No. 203.	Tincture of chloride of iron,	2 to 4 drachms.
	Peruvian bark,	1 oz.
	(Or quinine,	30 grains.)

Mix and give as a drench, in water, every four hours.

For applications to the part we have a choice of several. The Scotch veterinarians prefer *belladonna*, smearing the parts freely with the extract rubbed up with an equal quantity of oil or lard; or combined with aconite as a lotion.

No. 204.	Extract of belladonna,	1 oz.
	Tincture of aconite,	½ oz.
	Water,	1 qt.

Rub up together and paint on the part frequently.

French surgeons prefer the sulphate of iron.

No. 205.	Powdered sulphate of iron,	1 oz.
	Lard,	4 oz.

Mix and smear well on the swollen parts and the healthy skin near them.

Or the swelling may be painted with tincture of the chloride of iron; or a strong solution of nitrate of silver, two drachms to the ounce of water.

DROPSY—ASCITES.

Definition.—An accumulation of watery fluid in the cavity of the abdomen, in the sheath, legs, and other dependent portions of the body.

Causes.—Generally dropsy is a result of disease of the heart or liver; but sometimes it appears in animals which have been kept long on poor and insufficient food, in low and

ill-drained pastures. In the ox it not unfrequently is due to a scrofulous state of the system, characterized by growths in the lining membrane of the abdomen called "grapes."

Symptoms.—These are plainly apparent in the "pot belly" of the animal, which can readily be recognized as due to the presence of fluid by the dull sound it yields on percussion, and by the feeling of fluctuation or fluid motion it imparts to the hand. If there is any doubt, a small quantity may be drawn off with a fine trocar.

This condition is nearly always preceded by one of general poor health, often with signs of heart or liver disease, weakness and languor. As the fluid increases, the breathing becomes more difficult, the bowels irregular, the pulse feeble, and the coat loose and unthrifty. The swelling of the legs impedes the motions, and the animal dies of exhaustion.

Treatment.—The probabilities of success in this depends much on the cause of the dropsy. When it is due to heart or liver disease the prospects are far from cheering, and some writers recommend the animal to be killed. But when poor food and unhealthy surroundings have led to the condition, it may be removed by placing the patient in a dry, clean and well ventilated stable, giving a generous and nourishing diet, and administering, internally, tonics and diuretics, as—

No. 206.	Powdered digitalis,	1 oz.
	Sulphate of iron,	½ oz.

Mix for one ball, morning and night.

No lowering medicines whatever should be used.

If the water in the belly is extensive, and does not promptly diminish by medicine and proper food, it should be drawn off by a trochar, which should be plunged into the most dependent portion; this may be repeated as often as the accumulation of fluid demands it.

The class of medicines known as "diuretics," which exert

their action on the kidneys, find in this disease an appropriate sphere. The usual diuretic mass of the Edinburgh veterinary college is made thus:—

No. 207. Soap,
Nitrate of potash, each 2 lbs.
Resin, 3 lbs.
Venice turpentine, 2 lbs.
Oil of turpentine, ½ pint.

Melt the soap and resin over a slow fire; when cooling stir in the other articles. The dose of this mass is two ounces, made into a ball with a little linseed meal.

An efficient diuretic drench may be made thus:-

No. 208. Sweet spirits of nitre, 2 oz.
Oil of turpentine, 1 oz.

Give in a quart of decoction of broom corn tops.

The decoction of broom corn has by itself a very efficient action on the kidneys, and will often rapidly reduce dropsical swellings. The same is true of another domestic remedy, the milk weed (asclepias), which may be given in the same way.

No. 209. Soap, 2 oz.
Ginger, essence of 2 drachms.
Balsam of copaiva, 1 oz.

Dissolve the soap in a pint of old ale or hard cider, and add the other articles.

The above is praised by Mr. White as an active diuretic in dropsy of the belly.

No. 210. Acetate of potash, 1 oz.
Powdered camphor. 1 drachm.

Rub the camphor down with the yolks of two eggs, and give the whole in a pint of linseed tea, or decoction of broom tops.

CHAPTER VII.

DISEASES OF THE FOOT OF THE HORSE.

Structure of the Foot of the Horse.
Lameness in the Horse; How to Detect Lameness; How to Ascertain the Cause of the Lameness.
Inflammation of the Feet—Laminitis—Founder—Fever in the Feet.
Corns.
Thrush or Frush of the Frog.
Canker.
Punctured Wounds of the Feet—Prickings—Gathered Nails.
Sand Crack.
False Quarter.
Quittor—Fistula of the Coronet—Fibro-Chondritis of the Foot.
Navicular Disease—Grogginess—Contraction of the Foot.
Scratches—Mud Fever—Cracked Heels—Erythema of the Heels.
Grease—Eczema of the Heels.

In order to render clear the subjects treated of in this chapter, we shall be obliged to begin with a brief description of the

STRUCTURE OF THE FOOT OF THE HORSE.

The following cut (Fig. 21) represents a section of the foot divided through the middle lengthwise, that is, from

toe to heel, and shows the bones in their natural position in the healthy hoof.

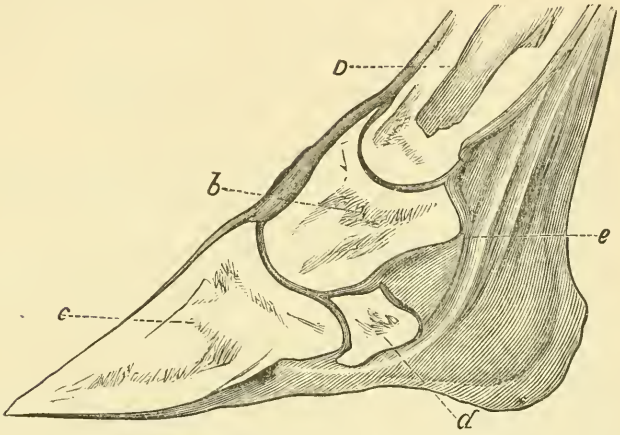

FIG. 21.—A SECTION OF THE HORSE'S FOOT.

Commencing above, the letter D indicates the lower end of the long pastern bone; *b* is the coronary bone, which lies internally from the upper or coronary border of the wall of the hoof; *c* is the coffin bone, or foot bone, *os pedis;* *d* is the navicular bone, a small bone of very great interest to the surgeon, because injury and inflammation of surface tissues is a very frequent cause of lameness, producing that condition called "grogginess." The navicular bone bears no part of the weight, but is apparently inserted for the purpose of giving increased leverage power to the long tendon, *e,* which passes from the coffin bone backward, over the navicular bone and up the leg.

It will be seen that from the upper part of the long pastern bone to the end of the coffin bone is a straight line, inclined at an angle of about 45° to the surface of the ground. This obliquity of position enables the bone to act as a spring, for the purpose of modifying concussion.

When, for any reason, the relations of this natural mechanism become disturbed, lameness is the result.

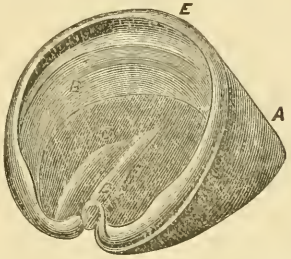

FIG. 22.—EXTERNAL PARTS OF THE HOOF.

Turning to the outer coverings of the hoof, we note that it is made up of two parts: the one seen above the ground, and the other that which is placed on the ground; in other words, the *wall* and the *sole*.

The wall is divided into the *toe* (Fig. 22, A), which is the forward point of the hoof; the *heel*, which is the hinder part, where the notch is seen; the *quarters*, which are the portions on each side, midway between the toe and the heel,

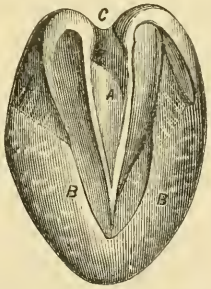

FIG. 23.—THE SOLE OF THE HOOF.

and which are known respectively as the *inside* and the *outside* quarter; the upper, or *coronary* border (E); the lower, or *solar* border; and the *bars*, which are the re-

flections of the wall, in toward the centre of the foot, on its ground surface. When the horse is not shod, it is upon these bars that he walks.

The ground surface, or sole of the foot, is made up of the bars, which, as we have said, are only parts of the wall of the hoof turned backward and downward; the frog (Fig. 23, A); the cleft of the frog (C); and the sole proper (B B), which forms the principal part of the ground surface of the hoof.

The four hard parts of which the hoof is composed, to wit, the wall, the sole, the frog and the two bones (coffin bone and navicular bone), can readily be separated by boiling. Besides these, there are in the hoof, the "fatty frog", or the plantar cushion which is above the frog, tendons, nerves, blood-vessels, cartilage, and glands for the secretion of the horny substance which forms the walls and frog.

Into these it is needless to enter, for although their thorough understanding is essential in order to appreciate the remarkable mechanism of the horse's motion, their consideration can be dispensed with in a work designed for practical purposes only.

LAMENESS IN THE HORSE.

It is often no easy matter to detect lameness in the horse; and when detected, it is often still more difficult to explain its cause and suggest a cure. We shall go into this subject at some length, because it is of such prime importance to every stock owner, and is so generally misunderstood; and we shall begin with some directions

HOW TO DETECT LAMENESS.

The horse is to be examined: first, at rest; second, in motion.

A lame horse standing at rest will generally favor the unsound limb by lifting it frequently, or by *pointing* it, that is, by extending it in advance of its fellow. If both feet are lame he will have a habit of lifting first one, then the other. In elbow lameness, the fore arm is extended, the knee bent, and the foot on a level with, or behind, its fellow. In severe shoulder lameness, the pointing is backward, the knee bent, and the foot behind its fellow, sometimes the toe only touching the ground. When the lameness is in a hind limb, the horse stands with it "knuckling over" at the fetlock, or with the foot altogether off the ground. If the lame leg is in advance of the sound one, this indicates that the disease is in, or below, the hock.

When both the fore feet are lame, the hind ones are advanced beneath the body, so as to receive as much of the weight as possible, while the front feet are lifted alternately. When both hind feet are lamed, the fore feet are planted beneath the chest, and close to the centre line, while the body is pushed forward, and the head hung down, so as to take as much weight as possible off of the hind feet.

Having noted carefully how the horse stands at rest, the next procedure is to examine the suspected limb. If there is unnatural heat, tenderness on pressure, or a swelling in any part of it, the suspicion of lameness is at once verified. But nothing of this kind may be obvious, even in cases of incurable lameness, so the horse should next be examined *in motion*.

It is far from easy to recognize all varieties of lameness in a horse in motion; and unscrupulous dealers know many tricks to conceal it. Thus, if one fore foot is lame, they

will make the other equally so, by paring it, so that the action of the two limbs correspond; they will check up his head, with a tight rein, to prevent the peculiar "nodding" motion, or dipping of the head, characteristic of a horse lame in a front foot; or they will select a gait to show him off which conceals his unsoundness. Again, some varieties of lameness are visible in the gait only when a horse begins to exercise; while other varieties only show themselves after half an hour's use. Of this, of course, the dishonest dealer will take advantage.

A proper examination is as follows:—

As soon as the animal is taken from the stable, let an assistant run with him at a slow trot, holding his head at only a moderate height. It is necessary to watch him trotting both *from* and *toward* the observer, for a horse lame in the off fore leg when trotted *from* the observer seems to have the fault in the near hind leg, as this quarter is the one seen to ascend and descend—an error which is corrected on seeing him approach. Another important point is to have the animal turned sharply *in both directions* while on the trot. The lameness from string halt (p. 91) can often only be detected by this motion.

When both front or both hind feet are lame, there is no perceptible limp, but a peculiar shortness of action. Each foot is carefully put to the ground and quickly lifted up again. A horse lame in the fore quarter nods or dips his head at every step; one lame in the hind quarter drops or jerks the croup.

Having examined the horse in a slow trot, if nothing is discernible, but yet it is desired to push the inspection further, the horse should be exercised at a rapid trot or moderate gallop for half an hour, then placed in a stall to cool off, for twenty minutes, and then brought out again. He will then assuredly show in his gait any splint or hock trouble that he may have.

TO ASCERTAIN THE CAUSE OF THE LAMENESS.

Lameness is not a disease in itself, but only the sign of a disease or an injury. It may arise from some local disorder in the foot, the bones of the legs or the joints; or from some general disease, as rheumatism, palsy, affections of the brain, and even of the liver.

In every case of lameness where the cause is not perfectly obvious, it is well to begin the search for it by removing the shoe and closely examining the foot for the presence of some of its numerous diseases, which will be shortly mentioned. Satisfied that the cause is not in the foot, we should next proceed up the limb, carefully scrutinizing the soft parts, the bones and the joints, for any signs of injuries, tumors, tenderness, swellings, or inflammation. If here, too, we are at fault, then we should run over the general diseases of the animal, mentioned above, which are accompanied by lameness as one of their symptoms. An examination conducted in this manner will seldom fail to result satisfactorily.

In the description of local diseases causing lameness, which follows, we shall pursue the course here indicated, beginning with diseases of the foot, and proceeding up the limb.

As the subject of lameness is so important to all dealers in horses, we add the following

CLASSIFICATION OF THE SYMPTOMS OF LAMENESS, AND THEIR SIGNIFICANCE.

The symptoms have reference to the animal either, 1, at rest, or 2, in motion. "Pointing," it will be borne in mind, may be only a habit; in that case one fore and one hind limb point; but when it is indicative of lameness, only one limb points.

Symptoms when at Rest.

Symptoms.	*Significance.*
Fore foot pointing, the foot in front of its fellow.	Lameness of the leg.
The fore arm extended, the knee bent, the foot about on a line with its fellow.	Lameness of the elbow.
The limb relaxed, the knee bent, the foot behind its fellow.	Lameness of the shoulder.
Hind foot bent, "knuckling over," or off the ground.	Lameness of hind foot.
Hind leg in front of its fellow.	Lameness in or below the hock.
Hind feet brought well forward under the belly; head reared.	Lameness in both fore feet.
Fore feet pushed back beneath the chest, head hanging.	Lameness in both hind feet.

Symptoms when in Motion.

Symptoms.	*Significance*
Head nodding or dipping.	Lameness in fore quarters.
Croup dipping, or dropping.	Lameness in hind quarters.
Foot lifted quickly, straight up.	Lameness of foot or hock.
Foot swung in a half circle, not much elevated.	Lameness of elbow or shoulder.
Foot brought down toe first.	Side-bone, sprain of back sinews, sprain of suspensory ligament, navicular disease, shoulder lameness, or hip joint lameness.

Foot brought down heel first.	Founder, seedy toe, sand crack, ring bone, stifle joint lameness, inflammation of carpus, or os pedis.
Little or no lameness at first, but increased on motion.	Splint, sore shins, side bones, disease of knee joint.
More or less lameness at first, diminishing on motion.	Navicular disease, or grogginess, weed, corns, rheumatism.
Little, or no lameness in a straight trot, but observable on turning sharply.	Stringhalt, strained back, shivering.

INFLAMMATION OF THE FEET—LAMINITIS—FOUNDER—FEVER IN THE FEET.

Definition.—An inflammation of the sensitive portions of the foot, including, at times, the laminæ, the sole and the foot bone.

Causes.—The causes of founder are numerous, and it is not surprising that it is one of the most common sources of lameness. It may arise from over exertion, from galloping, or trotting on hard roads, from excessive feeding, from drinking too much cold water when heated, from a sudden chill, from having to stand a long time in railroad cars, or on ships, and from a transfer of an inflammation from some other part of the body. Horses with heavy bodies and slim legs, and those which are very fat, are more liable to it than others; and animals which have been taken from country roads and put to work on hard paved streets, very frequently suffer from an attack.

Symptoms.—The inflammation is usually confined to one or both fore feet. He stands with the hind legs drawn up

under his belly, and his fore feet advanced, so as to relieve them of as much weight as possible. When the inflammation is active, the signs of pain are very manifest. The animal trembles and quivers, his eyes glare, his nostrils are dilated, he often groans with pain, and sweats moisten his skin. His pulse is full, strong and rapid, and his breathing is quickened. He is very unwilling to move; and, if pushed backward, will elevate his toes and throw his weight upon his heels, by a peculiar motion, on which some surgeons rely to diagnose the disease quickly. Sometimes he will lie down upon his side for hours together, with his legs stretched out, evidently relieved by this position.

If the hand is placed on the hoof and frog, they will be found hot to the touch, and sensitive to firm pressure; the pastern arteries beat violently.

When the hind feet are inflamed, the fore feet are pushed under the body, to support the weight; while the hind ones are extended forward, so as to throw the weight upon the heels; thus bringing all four of the feet close together, under the belly. When compelled to move, he takes a kind of a jump forward; but prefers to lie down, to escape the pressure on them when standing.

Such are the characters of acute founder. But frequently it is much less severe in its symptoms. In many old and over-worked horses there is little heat or fever, and the pain is not constant. After a day or two's work, slight inflammation is excited, causing a lameness, which disappears after a few days' rest, to reappear on the next occasion. This is often mistaken for rheumatism.

In old cases, when the disease has been often repeated or badly treated, it leaves behind it a condition known as "pumiced foot," the appearance of which is quite characteristic. On looking at the hoof it is seen to have a number of fur-

rowed, uneven or wavy ridges running around it, parallel to the coronet. They resemble ribs or irregular rings running together toward the front part of the foot.

Another result of acute founder is what is called "seedy toe." This name is applied to an inferior secretion of horny matter at the lower margin of the foot bone, and in a small space about the toe. The formation is of a porous, soft character, and liable to be aggravated by dirt and gravel entering its substance. Though not invariably producing lameness, it is at all times liable to do so, and must be considered an unsoundness.

An affection that has been at times mistaken for acute founder is inflammation of the muscles of the limbs, especially of the hind quarter and loin (myositis). In both diseases there are stiffness, lameness and loss of power of motion. The differences may be stated in a manner easy for comparison as follows:

Founder.	*Inflammation of the Muscles.*
The horse lifts his feet from the ground, first one then the other.	The horse keeps both feet on the ground, and is unwilling to move either of them.
When the animal lies down the pain and fever in the feet are lessened.	There is no tendency to lie down, and if cast, the symptoms are aggravated.
Generally occurs in the front feet.	Generally occurs in the hind quarters.

Treatment.—This, as often practiced, is far more hurtful than beneficial. It should be an absolute rule not to give large doses of purgative medicine. Experience has repeatedly shown that the irritation of the bowels thus produced often makes the disease much worse; indeed, it is said some cases have been brought on by an injudicious dose of the kind, leading to inflammation of the intestine and transfer to the feet.

A gentle laxative is, however, in place. We may prescribe

No. 211. Powdered aloes, 2 to 4 drachms.
Bicarbonate of soda, 1 oz.
Give as a drench, in a pint of warm water.

Should there be much fever, Prof. Williams states that he knows no treatment so effectual as aconite in repeated doses, say 20 drops of the tincture of the root every 2 hours, in the water, until the pulse decidedly falls. If the pain is very severe, however, he would give first attention to this, by administering one or two full doses of opium or morphia.

For local treatment to the foot, the most judicious is to envelop it in a large warm poultice, or wrap it in numerous woolen cloths and keep them wet with hot water. After the urgent symptoms have passed off, cold instead of hot applications will prove more useful.

Some writers of weight have recommended that the animal be moderately exercised during the course of the disease; but it is safe to say the majority do not favor this course. Others, especially the old authorities, urge the importance of bleeding. Certainly in the large majority of cases this is wholly useless; and if practiced at all it should only be in young, strong and full-blooded animals. Probably local bleeding from the coronary arteries just above the hoof will answer every purpose, and no doubt often does afford prompt relief.

Pumiced foot is incurable; but it can be greatly relieved by fitting to the foot a bar shoe with a broad circle, thicker at its outer edge and beveled off toward the center.

In seedy toe the diseased parts should be cut away, and the growth of a healthy secretion stimulated by blisters and strong liniments. The sole should be protected by bar shoes, properly adjusted. The probability of a cure is very slight.

CORNS,

Definition.—Small swellings or tumors on the sensitive sole, in the triangular space between the bars and the wall at the heel, found in the fore feet only, and almost always in the inside heel.

Causes.—The cause of corns is almost always bad shoeing, or wearing the shoe too long a time.

Symptoms.—Corns do not always cause lameness, though as a rule they do. They are always sensitive to pressure, and usually appear as tumors of a hard, horny character.

Treatment.—The shoe should be removed, and if there is inflammation, the foot should be poulticed, and if the corns are festered, an opening made to give vent to the pus. The seat of the corn should be pared, care being taken not to cut out portions of the bars or the frog. Many "corn salves" are recommended. Mr. Chawner gives the following:—

No. 212.

Tar,	
Beeswax,	
Honey, of each,	¼ lb.
Glycerine,	3 oz.
Lard,	½ lb.
Nitric acid,	2 drachms.

Melt the lard and beeswax together, stir in the lard and other ingredients, and stir till cold.

Another corn plaster is—

No. 213.

Subacetate of copper (verdigris),	½ to 1 oz.
Oil of turpentine,	2 oz.
Yellow wax,	½ lb.

Melt together and apply on a piece of leather.

THRUSH, OR FRUSH OF THE FROG.

Definition.—A diseased condition of the secretions from the frog, commencing at the cleft and extending over the whole of it, characterized by the discharge of a foul and fetid material.

Causes.—Standing in water and filth, such as wet straw and stable refuse; frost bite; irritating applications, or "stoppings" to the feet.

Symptoms.—The appearance of the frog, especially of its cleft, and the bad odor, are characteristic. There is nearly always tenderness on pressure, and consequent lameness.

Treatment.—Thrushes are usually easily cured. The animal should be placed in a clean stable, with a dry floor, well littered. The seat of disease should be cleaned, the excessive growth removed, and calomel applied, as—

No. 214.	Calomel,	½ oz.
	Sweet oil,	2 oz.

Mix, spread on a piece of lint or oakum, and insert in the cleft of the frog, and over any other diseased parts.

The whole should be covered with a layer of wood tar, or a leather shoe may be used for a while with advantage.

Some veterinarians use caustic pastes, as this, by Mr. Youatt:

No. 215.	Sulphate of copper,	2 oz.
	Sulphate of zinc,	1 oz.

Mix thoroughly with 2 lbs. of lard and one of tar, and every night and morning cover it with a piece of tow, and introduce it into the cleft of the frog.

Another is:

No. 216.	Tar,	4 oz.
	Sulphuric acid,	½ oz.

This to be applied on tow, as the foregoing.

Or nitric acid may take the place of the sulphuric acid in the formula.

CANKER.

Definition.—A diseased condition of the frog and sensitive sole, resulting in an unhealthy and fetid secretion of horny substance.

Causes.—It may arise from an injury, as a prick, or the irritation of a nail; but at other times the cause is obscure.

Symptoms.—There is an abundant, ill-smelling, colorless discharge from the frog, which is large, spongy and covered with fungous growths, and offensively smelling, cheese-like masses. The very disagreeable smell is attributed to the sulphuretted hydrogen in the secretion of bone substance.

Generally, there is a gross, heavy habit of body; hence, canker is most frequent in cart horses, with thick, round legs and large feet.

Treatment.—Some veterinarians say that the treatment of canker, by calomel (No. 214), is generally a successful one. Others have not found it so, and recommend the early removal of the whole horny sole of the foot, as the only effectual remedy. This is performed as follows:—

The animal having been properly thrown and secured, make a groove at the immediate junction of the sole and wall, all around the foot, commencing at the heel. Then divide this circle into two halves by a groove, from the cleft of the frog to the toe. Take a sharp scalpel and cut cleanly through these grooves, into the sensitive parts, so as to completely separate the sole from the wall. Strip off one-half of the sole first, then the other, removing every trace of the horny covering of both sole and frog. Cut away all fungous growths, and freshen up the whole with nitrate of silver. Pack with dry tow, bandage, and put on a leather boot. Apply a tourniquet, moderately tight, to the fetlock. The dressing should not be removed for two days, when it may be done very carefully, after a thorough soaking of the foot in warm water.

If fungous growths and the ill-smelling secretion still continue, the surface must be repeatedly dressed with power-

ful caustics, as nitrate of silver, sulphuric acid and tar (No. 216), and the like. An efficient caustic wash, is:—

No. 217.	Chloride of zinc,	40 grains.
	Water,	1 oz.

This is known as De Morgan's solution, from the eminent London surgeon of that name, and is unsurpassed as a wash for fistulous and foul wounds and ulcers, which cannot well be reached with the solid pencil of nitrate of silver, or chloride of zinc. The solution may be syringed freely on the part.

PUNCTURED WOUNDS OF THE FEET—PRICKINGS, GATHERED NAILS.

Most injuries to the feet, of this class, are caused by carelessness in shoeing; though, occasionally, a horse treads on an upright nail, or a thorn, and brings about a lameness due to its entrance into the sensitive portion of the hoof.

Symptoms.—The distinguishing marks of lameness from this cause are its sudden onset, when the horse is in health, without fever or other disease, and the intense pain. Should the accident not receive attention, it may lead to festering within the hoof, disease of the bones of the foot, sympathetic fever, and lockjaw.

Treatment.—The shoe should be gently removed, the foot washed and pared, and moderate pressure against the sole and wall of the hoof, all around, until some tender spot is found. This is then to be scraped and pared, so as to remove any foreign body, and to give free outlet to any pus which may have formed; and the foot then enveloped in a large and warm poultice. After a day or two, if the healing is delayed by proud flesh, or the continued discharge of an unhealthy and ill-smelling matter, the wound should be well syringed, several times daily, with a solution of car-

bolic acid: one drachm of the acid to an ounce of water; or, the following:—

No. 218..	Sulphate of zinc	
	Sulphate of copper, of each	2 drachms.
	Vinegar,	½ pint.

Mix, and use with a syringe.

SAND CRACK.

Definition.—A crack or fissure in the wall of the hoof, beginning at the coronet, and generally found in the inner quarters of the fore and the toes of the hind feet.

Causes.—There is usually a defective quality of horny substance secreted in these cases. It is too brittle, and on bad shoeing, or rapid traveling over hard roads, the wall of the hoof splits. Sometimes this happens suddenly, but generally the crack is of slow growth, beginning at the coronet and running downward.

Symptoms.—The appearance of the crack is characteristic; when the animal bears his weight on the foot it opens, and when he lifts the foot it closes. Thus sand and dirt easily effect a lodgment, and working into the sensitive parts, give severe pain, and cause marked lameness. Sometimes irritative fever and local suppuration ensue.

Treatment.—When there is much inflammation, the shoe should be removed, the edges of the crack pared, the fissure cleansed, and hot fomentations and poultices applied. Caustic should not be applied, even if there is a growth of proud flesh, according to Prof. Williams, on account of the danger of exciting further irritation.

When the inflammatory symptoms have abated, a bar shoe should be applied to the foot, and the edges of the crack be brought together and clasped, by an instrument made for the purpose, which can be had of any surgical instrument maker.

Two or three of these may be placed up and down the

crack. A small hole is bored with a red hot wire, to admit the insertion of thin hooks on each side of the crack, the sides of which are thus firmly bound together.

Another and a simple expedient is to cut several notches on one side of the crack, and drive a small horseshoe nail in the wall, passing across the crack, and coming out through the wall on its other side, where it can be firmly clinched. This also brings the edges of the crack so closely together that no dirt can enter, and if neatly performed, without injury to the sensitive structures beneath, will give immediate relief, and offer a very fair prospect of a permanent cure.

Instead of these mechanical appliances, some cases will recover by filling the crack, after cleansing it thoroughly, with the following composition, and turning the horse out to grass until a new hoof is grown.

No. 219.	Beeswax,	4 oz.
	Yellow resin,	2 oz.
	Oil of turpentine,	1 oz.
	Tallow,	½ oz.

Melt together.

FALSE QUARTER.

Definition.—A large crack or gap in the coronet or wall of the foot, showing a deficiency of the horn-making secretion of the part, or that the secretion is unhealthy.

Causes.—The usual cause is some previous disease of the coronary band, such as carbuncle, quittor, injury, severe frost-bite, or the like, which has altered its structure to such a degree that it can no longer perform its proper function of secreting the material for the horny layers.

Symptoms.—Although a horse with false quarter is not always lame, he is very apt to become so, and is esteemed unsound by all authorities. False quarter differs from sand-crack, both in origin and appearance; it is much wider at the

base and contains a modified condition of horn. The coronary band shows a loss of substance corresponding to that of the wall. The space where the wall is imperfect is tender to pressure, and requires careful shoeing and protection.

Treatment.—If there is a wound, its edges should be freshened with the knife or caustic, and a firm bandage applied, to bring them together. Stimulating washes of carbolic acid and water will keep the surface clean and hasten healing. In old cases little can be done besides filling up the fissure with gutta percha, and having the horse wear a bar shoe.

QUITTOR—FISTULA OF THE CORONET—FIBRO-CHONDRITIS OF THE FOOT.

Definition.—Inflammation and suppuration of the fibrous cartilage of the foot, extending by fistulous canals in various directions, with one or more openings upon the quarters and heels of the coronet. The name "quittor" is derived from the verb *to quit*, in the sense of to discharge, the external opening of the fistulæ being their vent or place of discharge.

Causes.—Pricks in shoeing, treads, suppurating corns, or any other injury which leads to inflammation of the cartilage in the hoof and the accumulation of pus inside the walls.

Symptoms.—A quittor differs from a wound or a recent abscess of the coronet, by the condition of the parts, which have taken on a peculiar unhealthy action; by the character of the surrounding tissue, which is hard to the touch; and by the presence of the fistulæ, or "pipes" as they are called by farriers.

The principal symptoms are lameness, which is often excessive; swelling upon the coronet, about the center of which one or more small orifices are seen, discharging a thin and watery or a thick and curdled matter. On examining with a

probe, the pipes are readily detected, leading generally in a downward direction toward and into the foot.

Treatment.—There is a variety of ways of curing quittor, and if we fail in the more mild, we must proceed to the more severe, and not be deterred by fancied feelings of tenderness.

First, if there are heat, swelling, and excessive tenderness, indicating an acute stage of the complaint, we must for the time be satisfied with poulticing the foot and giving it the utmost rest possible. The shoe should be removed, and any puncture or inflamed corn sought out and treated as directed under those headings.

These measures failing, the next step is to inject the fistulæ or pipes with caustic and strongly stimulating injections. For this purpose we may use.

No. 220.	Carbolic acid,	1 drachm.
	Water	1 oz.

Or,

No. 221.	Corrosive sublimate,	1 drachm.
	Water	1 oz.
	Nitric acid,	10 drops.

Once a day is often enough to use either of these, and it is useless to repeat them more than half a dozen times.

Should they fail, the next resource is what the old writers call "coring the pipes," that is, burning them out with caustics or the red hot iron. The former is effected by sprinkling about five grains of corrosive sublimate on a small square piece of tissue paper, folding it like a plug, and inserting it into the pipe, where it is retained by means of a bandage. In from five to seven days a circular slough will have separated, leaving a healthy wound, which with proper care will heal up from the bottom. The same end may be attained by pushing a pointed iron, at white heat, to the very bottom of the pipes, or by inserting a guarded bistoury, and

cutting their sides freely, and then syringing them with the stimulant above mentioned (No. 220).

If the quittor is near the front of the foot these procedures must be carried out with care not to injure the joint, which is there close to the surface.

A horse with quittor should not be worked, as it greatly retards recovery, or renders it impossible. It is also essential that during the cure his general system be well supported by nourishing diet, healthy surroundings and tonic medicines, when called for.

NAVICULAR DISEASE—CONTRACTION OF THE FOOT—GROGGINESS.

Definition.—An inflammation of the surface of the navicular bone, extending, occasionally, to its interior and to the tendon which passes over its surface, as well as to adjacent parts.

Causes.—This disease is said, by Prof. Williams, to be the most fertile cause of lameness, that we know of, in high-bred horses. For a long time its exact nature was doubtful, and even yet there is not an entire agreement among veterinary authorities; but the definition, above given, expresses the most recent views. It is believed that a rheumatic constitution predisposes it; and that a bad fitting shoe, sudden and violent exertion, and over-strain of various kinds, bring it on. Racing and hunting horses are those most subject to it.

Symptoms.—The lameness it produces may be sudden in its onset, or it may have been preceded by "pointing" of the foot, and shortness of step. The chief signs of the disease, are: a short, tripping gait, turning in of the heels, wearing away of the toe of the shoe, pointing of the limb while standing, and wasting of the muscles of the shoulder—what is called a *sweeny* (though this may arise from various other diseases). The motion is stiff and peculiar, and once care-

fully noted, will be readily recognized. On examining the foot it is often found hot, dry, and perhaps tender at some points, especially on bearing firmly on the hollow of the pastern. Tripping and stumbling are common.

As the disease progresses, a contraction of the size of the foot always follows, which may extend to the muscles of the fore arm and shoulder.

Treatment.—If this is commenced early, it will usually succeed; but if postponed for several weeks, the horse is ruined for life.

As soon as the lameness appears, and is traced to its right source, the shoe should be removed, blood taken from the arteries above the coronet, and the foot placed in a cold water bath for a few hours during the day, and wrapped in a poultice at night. No exercise should be allowed; and if the pulse is fast, an ounce of saltpetre should be given night and morning, in the water. Moderate doses of aloes (about four drachms), in a pint of water, will be of benefit.

If, after a fortnight, the disease is not conquered, a blister should be placed around the coronet; and this not bringing prompt relief, a seton should be put into the frog, as follows:

If the near foot is to be operated upon, the needle should be introduced from the frog upward; but if the off foot, from the heel downward. The frog should be well pared, a sharp-pointed, short, curved needle chosen, and its course not made too deep, as the sinew might be wounded. The point of the needle should be introduced about one inch from the toe, and brought out midway between the bulbs of the frog and the forward boundary of the hollow of the heel. The ends of the tape are then tied together, and the seton is dressed daily, for three weeks or a month. This will usually be found to cure the lameness; but if it does not,

the case may be looked on as hopeless, and the most that can be expected will be to render the horse, by care and quiet, able to do some moderate work.

Some relief may be obtained, by the following hoof ointment:—

No. 222. Tar,
Burgundy pitch,
Mutton suet, of each equal parts.

SCRATCHES—MUD FEVER—CRACKED HEELS—ERYTHEMA OF THE HEELS.

Definition.—An affection of the skin of the heels in horses, considered a variety of chronic erythema, depending on altered or suppressed secretions.

Causes.—Exposure to mud and water, melting snow, neglect of grooming, constitutional predisposition. It is particularly frequent in wet, open winters.

Symptoms.—The horse is more or less lame, especially on starting off in the morning. The skin of the heels is dry and cracked, presenting upon its surface scaly crusts, the parts swollen, and sensitive to the touch.

At times the scratches are on all four legs, and extend up to the belly; the horse is irritable, and some general fever is noted. This is the form called "mud fever," as it is generally brought about by the irritation of wet dirt, and lack of care. For its prevention, it is recommended to allow the dirt to dry on the horse, and then have it well brushed off, without the application of water; or if water is used to remove it, that the legs be well bandaged immediately afterward.

Treatment.—The plan recommended by Mr. Broad, of Bath, England, as always successful, is to groom carefully, give walking exercise, and apply to the parts, once or twice daily, the following:—

No. 223. Solution of subacetate of lead, 1 oz.
Glycerine, 8 oz.
Mix, and apply to the parts.

Sometimes the system needs to be strengthened by extra diet and tonics. And if the case seems very obstinate, the part is to be penciled over with nitrate of silver solution.

No. 224.	Nitrate of silver,	1 drachm.
	Water,	1 oz.

For a local application.

Or a mild blister is to be applied, and the system generally altered, by the administration of Fowler's solution of arsenic, in the usual dose, for a few days.

Other useful preparations are—

No. 225.	Powdered alum,	2 drachms.
	Sulphate of zinc.	20 grains.
	Water,	1 pint.

Wash the cracks well with this, and dress with petroleum ointment.

No. 226.	Acetate of lead,	
	Sulphate of copper, of each	½ oz.

Mix in a pint of water, for the same purpose as the last.

When the inflammation is considerable, it may have to be reduced by poulticing; the irritation and sensitiveness which remain can then be reduced by the following:—

No. 227	Acetate of lead,	
	Oxide of zinc, each	¼ oz.
	Lard,	3 or 4 oz.

To be applied after the part has been well washed

GREASE—ECZEMA OF THE HEELS.

Definition.—An inflammation of the skin at the back of the heels and fetlocks, with a formation of vesicles and pustules, yielding a fetid, watery discharge.

Causes.—Negligent grooming, exposure to cold and wet in standing, together with a constitutional tendency, or a low condition. Grease is scarcely ever met with in vigorous horses which are well cared for.

Symptoms.—There is an inflamed appearance of the skin, the surface dotted with small blisters and pustules, pouring

out a discharge of ill-smelling matter, often considerable in quantity. The limb is swollen and tender, and fever may be present. The hind limbs are more frequently affected than the fore ones. The hairs are matted together, and masses of proud flesh spring from the unhealthy sores, forming rounded bunches, which, from their imagined resemblance to the fruit, are called by farriers "grapes." Closer examination may discover various parasites in these masses, and around the hairs.

The main point of difference between grease and scratches is that the former is a moist, and the latter a dry disease of the skin (though irritation and ulceration of the cracks, in scratches, may sometimes deceive the hasty observer).

Treatment.—As the disease is very often owing to the poor condition of the animal, he should have an entire change of diet, should be comfortably housed and clothed, and given, once a week, a moderate dose of aloes (4 to 6 drachms in a pint of water). An ounce of saltpetre should be placed daily in his bucket of water.

Locally the parts should be kept clean by gentle bathing in tepid water, and dusting with dry oxide of zinc (flowers of zinc); or by bathing with the following, which is highly recommended by Prof. Dick in the early stages of the disease :—

No. 228.	Acetate of lead,	1 oz.
	Sulphate of zinc,	½ oz.
	Water,	1 pint.

Mix and apply twice daily, after cleaning the parts with warm soap and water.

For the "grapes" Prof. Dick recommends sprinkling them with powdered sulphate of zinc. Others clip them off with scissors; or fasten a tight ligature around their bases and let them slough off; or remove them with an actual cautery.

For the unpleasant odor of the discharge, a lotion made of one part of carbolic acid to ten or twelve parts of water will prove effectual. Prof. Gamgee recommends, as an excellent preparation—

No. 229. Tar, 4 oz.
Nitric acid, sufficient.

Pour the nitric acid on the tar, rapidly stirring the mixture until active effervescence ensues. For a local application.

Another preparation which he praises for the same trouble is—

No. 230. Nitrate of potash,
Oil of turpentine,
Sulphuric acid, each, 2 oz.
Vinegar, 1 pint.

Mix together, and then add as much sulphate of copper as it will dissolve, and apply locally.

For the bad odor a chloride of lime ointment is effectual—

No. 231. Chloride of lime, 3 to 6 ozs.
Lard, 1 lb.

Mix and apply to the parts. This also has the advantage, in summer, of keeping the flies away from the excoriations.

An American authority recommends—

No. 232. Sulphate of copper, 1 oz.
Water,
Whisky, of each, 1 pint.

Dissolve the vitriol in the water, then add the whisky. Apply three times a day, bandaging the part afterward.

CHAPTER VIII.

DISEASES OF THE LEG.

Inflammation of the Bones.
Sore Shins—Inflammation of the Metacarpal Bones.
Splints or Splents.
Ring Bones.
Bog Spavin — Blood Spavin — Inflammation of the Hock Joint.
Bone Spavin.
Thorough-Pin.
Capped Hock.
Side Bones.

INFLAMMATION OF THE BONES—OSTITIS—PERIOSTITIS.

The bones of the leg, and their covering, called the "periosteum," are liable to become inflamed, and to lead to several varieties of lameness, which we shall examine in order.

INFLAMMATION OF THE METACARPAL BONES—SORE SHINS.

This form of inflammation of the bones affects young horses, particularly race horses under four years old, and is due to the fact that they are so often violently overworked.

Symptoms.—Lameness of the leg; swellings of an elastic, tense and doughy feeling over the shin bone; tenderness and heat on pressure; sometimes slight general fever. The swelling may become very prominent, and tend to break externally, but it always preserves its elastic feel; or, it may remain small and gradually become quite hard, changing into bony matter, and the pain disappears.

Treatment.—If the swelling is decided and the pain severe, a narrow-bladed bistoury should be introduced beneath the skin, and the periosteum freely cut, so as to allow

its contents to escape. This is to be followed by warm and soothing fomentations, as hot water containing a tablespoonful of laudanum to the pint; later by cold water dressing, and if healing is not prompt a blister should be applied to the part.

With this, the constitutional treatment should not be neglected. A smart purgative is required, followed by small, repeated doses of aconite (twenty drops of the tincture of the root three or four times a day), low diet, and the animal kept as quiet as possible.

In the less severe forms incisions are not called for, and the cold applications may be employed from the outset, succeeded by blisters, if needed.

SPLINTS OR SPLENTS.

These arise from another form of inflammation of the metacarpal bones. They are usually found upon the inner surface of the leg, at the upper third of the bone. They are a bony growth, the result of slight inflammation. Although when single and small they may exist without causing lameness, their presence may be considered a mark of unsoundnesss.

In regard to their causes, it is said that they are frequently hereditary, and are at other times developed by a long continued moderate gait, from concussions and bruises. Slightly built horses are most subject to them.

The peculiarities of lameness from splints are: (1) The horse is often quite young (2) A splint-lame horse will show it little or none in his walk, but in a marked manner in his trot, the drop of the head upon the sound side being very great. (3) The knee does not bend readily. (4) The lameness increases the longer he is kept in motion. (5) Tenderness on firm pressure over the seat of the splint.

Their presence may usually be recognized by running the

finger down the slight groove formed between the main shank bone and the smaller one behind, where they will be felt as small, bony swellings.

Treatment.—In new and acute cases, with decided swelling and tenderness, a sharp scalpel should be inserted beneath the skin, and the sheath of the bone freely divided. A seton may be placed over the spot, an active purgative administered, and the part thoroughly fomented.

If these measures fail, it is well to fire the part as recommended on page 64.

After an apparent cure the lameness may return, in which case it is best to take the shoes off, turn the animal into pasture, and give him a long rest.

A writer in the London *Lancet* has given the following as a useful liniment in splint:—

No. 233. Oil of origanum,
Oil of turpentine, each 1 oz.
Alcohol, ½ oz.
To be applied night and morning, for a few days at a time.

RING BONES.

These are deposits of bony matter above and below the coronet. They are produced by heavy work in draught horses, or by rheumatic disease.

Lameness may not be present, although when inflammation is active, it may be extreme. The lameness is worse on hard ground, and usually increases with exercise. Swelling may be scarcely perceptible, and confined to the sides of the pastern bone, or it may be an extreme enlargement of the whole region. Forcible bending of the pastern causes pain, as does also firm pressure on the swelling.

Treatment.—Active inflammation, when present, should be treated as heretofore described. When this is absent, the treatment is chiefly mechanical. When the ring bone is in

the fore leg the horse puts the *heel* down first; in this case a thin-heeled bar shoe should be used. If, on the other hand, he puts the toe down first and endeavors to walk on it, this shows that the ring bone is in the hind limb and on the sides or back of the pastern. He should then wear a high-heeled shoe.

INFLAMMATION OF THE HOCK JOINT—BOG SPAVIN—BLOOD SPAVIN.

The hock joint in the horse corresponds to the ankle joint in man, and is subject to a class of diseases called *spavins*. Of these, *bog-spavin* is the result of inflammation of the structures of the joint. It is, in its acute forms, a tense fluctuating swelling, accompanied by heat and tenderness, and producing decided lameness. In a more chronic form it seems to be but a dropsical swelling of the joint, and may exist without apparently interfering with the gait.

The tendency in the acute form is toward ulceration of the cartilage of the joint, and a consequent permanent stiffening of its motions. In chronic spavin, which is usually of a rheumatic character, there is a slow depositing of bony substance in and around the joint, which also leads to permanent impairment of the functions.

Blood spavin is strictly a distention of one or more of the veins in the neighborhood of the hock, caused by the pressure of the swelling impeding the flow of the blood.

Treatment.—The treatment of acute spavin should be by liberal doses of opium, to relieve pain, placing the horse in the slings to take the pressure off the joint, fomenting this with hot water, giving a moderate dose of aloes, and adding an ounce of saltpetre to the water, morning and night.

As soon as these measures have conquered the inflammation, setons and blisters to the hock, and rubbing it freely with ointment of iodide of mercury (No. 162), will prevent the remaining lameness.

When in chronic cases there is considerable deposit of water around the joint, blisters, setons and firing will often lessen it. But when the bony deposits are once formed, there are no means at our command to remove them. As a blistering liniment in chronic cases, we may use—

No. 234.	Mercurial ointment,	2 oz.
	Oil of cantharides,	4 drachms.

Mix and use locally.

The oil of cantharides, which is preferred by some veterinarians to other forms of Spanish flies, is made thus:—

No. 235.	Powdered flies,	1 oz.
	Olive oil,	8 oz.

Digest in a water bath for three hours, and filter.

It is an efficient stimulating liniment.

BONE SPAVIN.

Definition.—A bony growth on the inner and lower side of the hock, arising from inflammation of the adjacent bones (the cuneiform and metatarsal), terminating generally in a bony union between two or more bones of the hock, and thus creating a permanent unsoundness.

Causes.—These are defined to be hereditary and constitutional. All writers agree that bone spavin is transmitted from sires and dams to colts. Local exciting causes are sprains of the ligaments, and the use of shoes with high heels or calks. Blows, it is believed by the best surgeons, do not cause spavin, in spite of what certain horse breeders have maintained to the contrary.

Symptoms.—Spavins do not always cause lameness, but it is almost impossible to say which ones are not liable to develop it. As a rule, those in front of the hock are most feared. The lameness is, as a rule, removable in young horses, but incurable in those past their prime. Yet one which has existed for a number of years without producing

serious trouble with the gait, will, as a rule, never do so. There is always a certain stiffness about a spavined horse, which is observable to an experienced eye, although it is often so slight as to pass undetected by ordinary witnesses.

Treatment.—The treatment for recent cases is the same as that directed for other inflammations in the foot and neighborhood.

When the acute symptoms have subsided, blistering or firing, or the insertion of a seton is called for. Various stimulating oils, and the like applications, are used for a similar object, as—

No. 236.	Oil of turpentine,	12 parts.
	Corrosive sublimate,	1 part.

Mix for a resolvent ointment

The objection to corrosive sublimate is that it blemishes.

No. 237.	Mercurial ointment,	4 oz.
	Powdered cantharides,	½ oz.
	Oil of rosemary,	2 drachms.

Thoroughly and frequently rubbing the part with *oleate of mercury* (referred to under Rheumatism, p. 181), will dissipate as much of the swelling as has not become bone.

Firing has often been used with success in very obstinate cases; and of all our resources, it is the one on which most confidence can be placed. The objection to it is that it blemishes; but any severe caustic application may do the same; and by the use of Prof. Williams' firing iron, previously described (page 65), this objection is largely removed.

Setons are next in value, if not fully equal; and if skillfully inserted, leave little mark. They should be passed beneath a considerable tract of skin, covering the site of the spavin, and the tape anointed with one of the stimulant preparations mentioned in Part First (p. 64).

Before using any of these external remedies, it is good

practice to insert under the skin a narrow-bladed bistoury, and scarify the site of the spavin freely; and during the treatment, which on an average will be two months, the horse should be stabled and used very little.

THOROUGHPIN.

Definition.—A dropsical enlargement of the sheath of the tendon which passes along the upper and posterior side of the hock joint (synovial effusion in the bursa of the flexor pedis perforans muscle). The disease receives its name because the fluid which fills it may by pressure be forced from one side of the hock to the other. There is really no connection between the joint of the hock and the sheath of the tendon. *Thorough-pin* is a dropsical effusion in the latter; *bog spavin* is a similar effusion in the former.

Causes.—Thorough-pin is usually found in short, fleshy horses, and those which have heavy loads to start, thus straining the tendon of the perforating muscle.

Symptoms.—The distinctions pointed out in the definition of the disease will serve to distinguish it from bog spavin, which is the only disease with which it is liable to be confounded.

Treatment.—The horse should wear a shoe with high heels, and a spring truss be applied to the swelling, exerting upon it steady compression.

A more active plan, recommended by some, is to make a free puncture at the most dependent part of the swelling, and allow the whole of the fluid to drain off, keeping the puncture open for several days. Meanwhile the sack should be injected with a mild solution of sulphate of zinc (ten grains to the ounce of water), or with dilute tincture of iodine.

No. 238.	Tincture of iodine,	1 drachm.
	Whisky,	1 oz.

Inject one or two teaspoonfuls.

The walls of the sack should then be brought into close contact by a firm flannel bandage, and the horse be rested for a week.

Other surgeons use a resolvent ointment, as

No. 239. Biniodide of mercury, 1 part.
Neats-foot oil, 7 parts.

Rub well together, and apply by gentle friction every day, until the skin is inflamed.

CAPPED HOCK.

Definition.—A swelling on and around the point of the hock, caused either by an effusion into the tendon of the gastrocnemius muscle—Synovial Capped Hock—or into the loose tissue between that tendon and the skin—Serous Capped Hock.

Causes.—Both these forms of capped hock generally proceed from kicking and striking the point of the hock against some hard object, and are indicative of a vicious temper as well as of an unsound horse. The synovial form causes lameness, but the serous form does not necessarily do so.

Treatment.—The serous form can generally be cured by blistering and applying firm presssure with a strong elastic bandage. The synovial form must be managed in the same manner laid down for thorough-pin, it being a disorder of a strictly similar nature.

SIDE BONES.

Definition.—A change to a bony substance, taking place in the lateral cartilages of the fore feet.

Causes.—This change is usually found in heavy draught horses, and is attributed to the over expansion of the cartilages from the great weight of the animal, added to a hereditary tendency, and shoeing with high calks.

Symptoms.—Lameness is not invariably present, but the action of the horse is "stilty;" the feet are contracted, altered in form, flat or convex in the sole, and weak in the heels.

The presence of the side bones may be detected by pressing upon the cartilages; when in health these are yielding and elastic, but when ossified they lose this character and are hard, enlarged and unyielding.

The lameness of side bones differs from that caused by ring bones. In side bone lameness the toe of the foot is first brought to the ground; when both feet are involved, there are a shortness of step and a want of elasticity in the action, resembling that of "grogginess" (p. 209).

Treatment.—This must be by the use of the bar shoe; rest to the limb; counter-irritation by blisters and firing. Removal of the cartilages with the knife has been tried in France, but without satisfactory results.

CHAPTER IX.

WOUNDS AND INJURIES, AND THEIR RESULTS.

The General Treatment of Wounds; To check bleeding; Cleaning the wound; Restoring the position of the parts; To prevent inflammation.
Sprains or Strains.
Strains of the shoulder and leg; Rheumatic joint; Sprain of the flexor muscles; Shoulder Slip; Sprain of the back sinews, or flexor tendons.
Injuries of the Foot and Lower Leg; Interfering; Overreach; Tread, or Calking; Speedy cut; Brushing.
Wounds of the Knees—Broken Knees.
Elbow Sprain—Elbow Lameness.
Breaking Down—Strain or Rupture of the Suspensory Ligaments.
Wind-galls.
Curb—Sprain of the Calcaneo-cuboid Ligaments.
Poll Evil.
Fistulous Withers.
Rotten Bone—Necrosis and Caries of Bones.
Frostbite.
Burns and Scalds.
Stings and Bites.
Hernia—Rupture—Burst.
Choking.

THE GENERAL TREATMENT OF WOUNDS.

Whatever form of wound we are called upon to treat, we should proceed to attend to four points to wit:

1. To stop the bleeding, if any.
2. To wash and clean the wound thoroughly.

3. To bring the parts as near as possible into their natural positions, and keep them there.

4. To guard against excessive inflammation.

The means we have to accomplish these results are as follows:—

1. *To Check Bleeding.*—If the blood is bright red, and flows in spurts or jets, an *artery* has been cut. Its open end must be sought for, seized with the forceps, drawn out a little and tied with a thread. A little practice will enable any one to do this with great ease.

If the flow is steady and of dark blood, it need cause no anxiety. Bathing the part in alum water (1 oz. of alum, in powder, to a pint of water), rubbing it with a piece of ice, or sponging it with clean water will quickly check it.

2. *Cleaning the Wound.*—This is best done by pouring water on it from a height, not rubbing it with sponges or rags. Pieces of hair, dirt, etc., can be picked out with the forceps. Nothing is so useful for a cleansing wash as a weak solution of carbolic acid, one or two ounces of the acid to a gallon of water.

3. *Restoring the Position of the Parts.*—The edges of a cut wound should be carefully brought together and sewed or held by sticking plaster. A broken bone should be replaced in its natural position and held there by splints. Strong curved surgical needles should be in the outfit of every stock owner, and he should practice their use on the dead animal. Where they are not convenient, the edges of a wound may be held together by inserting a strong pin and a twisted suture, as shown on page 67.

The sutures are generally removed on the fifth or sixth day.

As to local applications, after the wound is thus put up, they are to be found in any quantity. Some good surgeons

advocate nothing but a dry bandage; others a wet one, moistened with cold or hot water, carbolic acid water, creasote and water, tar, petroleum solution of borax, and many other substances. Wet clay has been praised. And there are a great many ointments, balsams, oils, etc.

Whisky and water, equal parts, either simple or containing one grain of corrosive sublimate to the pint, is an excellent dressing.

4. *To Prevent Inflammation.* The older surgeons had a great fear of "wound fever," and to prevent it were wont to bleed and starve their patients after an injury. This notion has long since disappeared from human surgery, but still holds its grounds with some veterinarians. It is a pernicious error.

All that is needed to prevent too violent reaction after a wound—and that is what was meant by wound fever—is to keep the animal quiet, and if feverish symptoms appear, to put an ounce of saltpetre in the drink, night and morning, and administer a gentle purge. If there is much pain, nothing equals a full dose of opium, either in the shape of laudanum by the mouth or of morphia beneath the skin.

The dressings on the wound should be neatly and comfortably applied, and then not often changed. Cloths wet with weak carbolic acid water two or three times a day are never approached by flies or maggots, a point that must always be watched in the lower animals.

Often the wound is not seen for purposes of treatment until days after it has occurred, and after it has become foul, ulcerous, bad smelling, with ragged edges and perhaps filled with maggots.

Here the first step is to clean and disinfect it thoroughly. To kill the maggots it may be freely sprinkled with calomel. This will penetrate into the recesses of the wound and destroy them promptly. Ragged edges and pieces of dead

skin should be cut away, loose shreds removed with the scissors, and the wound washed by pouring warm water on it from a height. When in this manner it is well cleaned it should be thoroughly swabbed with a feather, or a piece of tow on the end of a stick, with a disinfecting and stimulating lotion, in which also pieces of tow, lint or rag should be wet and laid in and over the wound; the whole to be covered by a bandage wet with the same. The wetting should be repeated two or three times a day, but the bandage need not be removed as long as the part appears progressing favorably and the animal is comfortable.

Of such disinfecting and stimulating lotions we shall give a number of formulas, so that when the ingredients of one are not convenient another may be chosen :—

No. 240.	Alcohol or whisky,	1 pint,
	Corrosive sublimate,	1 grain.
No. 241.	Carbolic acid,	2 drachms,
	Water,	1 pint.
No. 242.	Powdered alum,	½ oz,
	Sugar of lead,	1 oz.
	Water,	1 pt.
No. 243.	Hydrate of chloral,	½ oz.
	Water,	1 pt.

A very excellent application.

No. 244.	Creasote,	1 drachm,
	Water,	1 qt.
No. 245.	Chloride of zinc,	1 drachm,
	Water,	1 qt.
No. 246.	Tar,	½ pt.
	Boiling water,	1 gal.

Crude petroleum is an excellent application also.

SPRAINS OR STRAINS.

Definition.—Stretching of a muscle, sinew or cartilage, with rupture or other injury to some of its fibres.

Causes.—Sprains may arise from sudden violent exertion, or long continued slight overtasking of the parts. They are common in the horse, which is so frequently set to work above his powers; and they cause a number of lamenesses, of frequent recurrence.

Symptoms.—Strains are always followed by more or less inflammation, characterized by pain and tenderness, heat and swelling in and around the part strained. Unless relieved by proper measures, this condition is very liable to lead to one of atrophy or withering in the part, a form of unsoundness which is familiarly known in the horse as *a sweeny*, from the German word *schwinden*, to grow less, to disappear,

Treatment.—The general line of treatment in sprains and strains may be stated as follows: (1) Give the part rest; (2) Reduce the early inflammation by cold or hot water fomentations, cooling lotions, etc. (3) Firm and steady pressure by bandages, to prevent "bagging" (serous infiltration); (4) Counter-irritations and gentle but regular use, to prevent stiffness and sweeny.

In carrying these principles out we may use, to reduce inflammation, either plain cold or quite hot water, whichever gives most relief. Or we can employ some of the many evaporating and refrigerant lotions which have been suggested, as, for example—

No. 247.	Sal ammoniac,		1 oz.
	Nitrate of potash,		2 oz.
	Water,		1 pint.

Mix and use as soon as it is made.

No. 248.	Acetate of lead,		1 oz.
	Vinegar,		
	Water,	each,	1 pint.

An efficient, cheap and useful lotion.

No. 249.	Spirits of camphor,	1 oz.
	Vinegar,	4 oz.
	Water,	1 pt.

Also cheap and effective.

No. 250.	Tincture of arnica.	½ oz.
	Water,	1 pt.

A very popular lotion. Eminent surgeons, however, doubt whether the good effect is not owing to the alcohol in the tincture rather than the arnica.

After the inflammation has subsided there are almost always stiffness, swelling and pain on motion of the part, often very slow to disperse, and particularly so in old patients. A host of substances are used for rubbing and irritating the surface, in order to stimulate the vessels and bring about the absorption of the effusion. As among the most effective of these, we mention *oleate of mercury*, already described (see page 181), and the ointments of the iodide of mercury (No. 162), and of iodine (No. 81). Any one of these diligently and persistently used will generally dissipate the swelling.

Others of value are the two following, recommended by Mr. Dun :—

No. 251.	Mercurial ointment,	2 oz.
	Camphor,	1 drachm.
	Oil of tar,	
	Linseed oil, each	4 oz.

No. 252.	Mercurial ointment,	2 oz.
	Creasote,	1 drachm.
	Solution of ammonia,	2 oz.
	Linseed oil,	6 oz.

Mr. Gamgee speaks favorably of—

No. 253.	Iodine,	½ oz.
	Glycerine,	
	Mercurial ointment, each	2 oz.
	Olive oil,	6 oz.

All of the above are excellent combinations, useful not only in the swellings from old sprains and strains, but in those from chronic rheumatism, scrofulous enlarged glands

(as in the slow form of strangles, goitre, etc.), and the late results of inflammation of the udder, in weed, etc.

To those we may add—

No. 254. Oil of turpentine, 1 oz.
Spirits of camphor, 2 oz.

Specially recommended for pains in the shoulder, threatened with sweeny.

No. 255. Iodine, 1 oz.
Soap liniment, 12 oz.

For callous swellings after bruises, and chronic glandular enlargements.

STRAINS OF THE SHOULDER AND LEG.

Lameness which has its seat in the shoulder joint may be owing to three different conditions.

1st. Rheumatism or injury in the joint.

2d. Strain of the back or flexor muscles.

3d. Shoulder slip.

We shall proceed to consider briefly each of these.

1st. Rheumatism or Injury in the Joint.

This is what is generally meant by the term "shoulder lameness." The gait of the horse reveals the seat of the disease at once to a practiced eye. He does not carry his limb straight forward, but with a circular or swinging motion, the foot being thrown outward, so that the toe is made to describe the arc of a circle. Sometimes the toe is dragged along the ground, pain in *lifting* the foot being characteristic of shoulder and knee lameness, while pain in *putting it down* is characteristic of foot lamenesses.

If when the horse is at rest the limb be moved backward and forward, he will shrink and show distinctly the hurt he feels. Sometimes swelling and heat about the joint can be discovered.

2d. Sprain of the Flexor Muscle.

This is the muscle which lifts and advances the limb, and

it is quite common for it to suffer from over exertion. It will be found swollen and tender along its whole course. Such an accident is especially common in plough horses, and is nearly always on the off side, because the limbs and shoulders are thrown into an irregular position by walking in the furrow. Such horses will work on the road without any lameness, but will show it as soon as they are put to the plough.

3. *Shoulder Slip.*

By this is meant a peculiar outward slipping movement of the shoulder joint at each step the animal takes when the foot of the lame limb is upon the ground, and the opposite one lifted. It might be supposed that each step threw the shoulder out of joint. But this is not the case. The cause of the trouble is the relaxation of the muscles which usually hold the bone firmly into the cavity of the joint (those muscles called by anatomists the anterior spinatus, the posterior spinatus, and the external round muscle). This allows the bone to slip around loosely, spoils the gait, and is liable to be followed by sweeny.

Treatment.—The management of these injuries must be on the general principles laid down for sprains. When recent, and when inflammation is present, the horse should be slung, and the part treated with cold or hot fomentations.

Generally, however, a more important question is what to do with such cases in their chronic stage, when they are of long standing. Some horse doctors claim vast skill in their treatment of sweeny, their process always being a profound mystery.

The best books on the subject do not have other recommendation for the restoration of the muscles when wasted than the repeated applications of moderately stimulating lini-

ments, and mild blisters, and a long period of rest in the barn-yard or at grass.

There are two agents, however, worth trying: The one is the hypodermic injection of strychnia, one-half to one grain daily, immediately over the "sweenied" muscle; and the other the steady and intelligent use of electricity. When the animal is a valuable one, it will pay to have one or both these measures carried out by a skillful person.

SPRAIN OF THE BACK SINEWS, OR FLEXOR TENDONS.

This strain or diseased condition of the back sinews is generally seen in cart horses and others required to pull heavy loads. It is a very common variety of lameness. The sinew becomes swollen, tender, enlarged and a little shortened, so that the horse stands on his toes and cannot put his heels to the ground. The leg is held stiff and upright and the toe dug into the ground.

The treatment required is a high-heeled shoe, with rest, and stimulating liniments. In old cases, where there is much shortening, the sinew may be divided beneath the skin, by the operation called *tenotomy*. To perform this requires a close knowledge of the anatomy of the parts, to avoid wounding the artery, so that it had better be left to the professional veterinarian.

INJURIES OF THE FOOT AND LOWER LEG.

Interfering.—This is an injury of the fetlock, caused by a blow by the opposite foot. It is commonly seen in young and awkward, or else ill-shod horses, and can generally be prevented by judicious shoeing and protecting the fetlock with a piece of leather.

An Overreach is an injury to the coronet of the fore foot by the shoe of the hind foot. It, too, is often owing to im-

proper shoeing, but some horses, when traveling at a rapid gait, are liable to the accident, although well shod.

A *Tread or Calking* is a wound upon the coronet by the shoe of another foot of the same animal; or by the foot of another animal when crowded together, as at fairs, in railroad cars, etc. It is liable to bring on quittor, and thus cause serious damage.

A *Speedy Cut* is a contusion on the fore leg, either above or below the knee joint. It generally occurs when the horse is pushed to considerable speed, and is a dangerous accident to both horse and rider, as the animal is apt to fall down suddenly, from the violence of the pain. It can sometimes be prevented by careful shoeing, but this does not succeed with some horses. In such it constitues, in law, an unsoundness.

Brushing is caused by the shoe of one foot striking against the fetlock. It is generally in the hind limbs, and in young horses or those exhausted and out of condition. The remedy is to use preventive shoes, according to the nature of the injury.

Most of these injuries may be lessened or prevented by a scientific manner of shoeing, for which no specific directions can be well given, as the form and manner of fastening the shoe must vary with the particular foot and the particular nature of the injury. As for the treatment of the latter itself, it will be in accordance with the general treatment of wounds and injuries as laid down on pp. 225, etc.

WOUNDS OF THE KNEES—BROKEN KNEES.

Any injury whatever to the knee of a horse may have disastrous results, and should be closely watched; nor should a purchaser accept as sound an animal that is scarred or at all swollen at the knees. All careful horsemen give the closest attention to such injuries, and treat them as follows:

1. *When the skin is bruised but not cut.*—Tie up the animal's head so that he cannot lie down; sponge the knee repeatedly with a cooling lotion (No. 247): if there is much swelling give a purge.

2. *When the skin is cut.*—Clean the wound very carefully, by repeated washing, and if needed a poultice, then clip the hair around it, and fasten the edges together with sticking plaster, and bandage lightly. Never stitch or pin a knee wound. Stitches will not hold and always blemish.

3. *When the sheath of the sinew is torn open.*—The swelling is generally very considerable, but the wound appears worse than it will prove to be if careful treatment is used. Tie the horse up, clean and fasten the parts together, as above directed, give a brisk purge, use saltpetre daily in the water, and when the wound is healing hasten absorption by stimulating liniments. If the wound becomes unhealthy, syringe it with weak carbolic acid water (one drachm to the pint).

4. *When the sinew is torn and the joint opened.*—A wound of this severity will either kill the horse, from the fever, suppuration and exhaustion which are certain to follow; or, if he recovers from these, will leave him with a stiff joint and lame for life. It is only in exceptional cases, therefore, that it is worth while to try to save him. He should be treated as last described, with the addition of strong tonics, to keep up his strength.

ELBOW LAMENESS, ELBOW SPRAIN.

A lameness which arises from a disease of the elbow joint or a sprain of its ligaments, shows itself by a half-bent position of the limb while the horse is standing; unwillingness to lift the foot far from the ground; and an excessive dropping or nodding of the head and shoulders when in motion.

The cause of a sprain at this point is usually the horse's

fore leg slipping outward or forward on the ground, in frosty weather. The usual signs of inflammation may generally be discovered around the elbow, on examination.

BREAKING DOWN—STRAIN OF THE SUSPENSORY LIGAMENT.

The suspensory ligament is at the back part of the knee, and passes down to the foot. Its strain usually takes place in young, fast horses who are speeded beyond their powers. When it comes on suddenly, with actual tearing of the ligaments, the horse at once becomes excessively, and often permanently, lame, and the injury is called "breaking down." It may also appear gradually, and then, if taken in time, a few months' rest and the ordinary treatment will restore the parts to their original strength.

The lameness, when from "breaking down," appears suddenly, in either the fore or hind leg; there is intense pain, heat and swelling, the horse turns up his toes, and there is a falling of the fetlock pads. He stands on his fetlocks, as it were, the toe being turned up and the sole looking forward. The same symptoms, in a much milder form, mark the slower and insidious form of the injury.

WINDGALLS.

Definition.—Dropsy of the bursa of the sesamoid bones at the back part of the fetlock, or inflammation of the bones themselves, with effusion.

This injury shows itself when it is in the form of windgalls, as soft, puffy swellings about the size of a hickory nut, to the back and sides of the fetlock. They are not considered an unsoundness, as they can generally be dispersed by a stimulating liniment and wearing a high-heeled shoe. Or the swelling may be opened, the fluid allowed to escape, and the sac injected, as recommended for bog spavin, page 219.

But there is a hard variety of windgall, where the small "sesamoid" bones themselves are inflamed, and this is a more serious matter. The horse is then lame, going on his toe, and there is heat and and swelling at the back of the fetlock. The swelling is tense and hard, quite different from the "boggy" feel of common windgall.

For the relief of the latter, it is recommended to place the animal in slings, and to bathe the part steadily with cold water; when the tenderness lessens, give him rest, and let him for a long time wear only high-heeled shoes.

CURB.

Definition.—A sprain of one of the ligaments of the foot (the calcaneo-cuboid ligament).

Symptoms.—Curb presents itself in some instances as a small, hard nodule upon the lower part of the back portion of the hock. In others it is an elastic, moderately soft, but firm and easily seen protuberance on the back of the hock, four to five inches below the point of the heel bone (os calcis). Hocks which are bent over are most liable to curb.

The lameness curb produces is marked by difficulty in extending the hock, and in some severe cases by the animal keeping the limb elevated so as to relax the ligaments.

Treatment.—The shoe should have a high heel, and the part be placed at rest and treated with cold water and cooling lotions as long as any inflammation remains, as evidenced by heat and tenderness.

When this has disappeared, it will often be found that the swelling remains in a chronic condition. To induce its absorption, steady friction with an absorbent ointment is usually successful, as—

No. 256.	Biniodide of mercury,	1 drachm.
	Lard,	1 oz.

After cutting the hair over the swelling, a little of this may be rubbed in every night, until a free watery discharge is produced on the surface. The leg should be fomented with hot water, to encourage the flow, and if after a week's time the curb has not disappeared, the ointment should be applied again in a similar manner.

POLL EVIL.

Definition.—A fistulous ulcer, situated immediately behind the ears of the horse.

Cause.—Poll evil is caused by accidental violence, or more frequently by the use of a tight, bearing rein.

Symptoms.—In its first stage, it is a soft tumor, surrounded by a tender swelling, with stiffness of the neck. Later, it breaks externally, and forms a deep ulcer or abscess, discharging unhealthy, ill-smelling matter. The fistula may extend deep into the structures of the neck, sometimes even to the neck bone, and the joint between the head and the neck, causing intense suffering. In such cases, if a probe is inserted and pushed carefully along the track of the fistula, the bone can be felt at its bottom.

Treatment.—If seen early, when there is no external opening, the horse should have a moderate purge, and the part be kept wet with cold water or a cooling solution, as—

No. 257.	Tincture of arnica,	2 oz.
	Vinegar,	
	Water, each	1 qt.

Lay cloths on the swelling, and wet them frequently with this.

If the inflammation is overcome, the hardness remaining can be dispersed by rubbing with an ointment of iodine or iodide of mercury, as—

No. 258.	Iodine,	1 drachm.
	Lard,	1 oz.

Mix for an ointment.

No attempt should be made to open the swelling unless pus can be distinctly felt, when it cannot be done too promptly. A free cut should be made, the wound kept open for about a week, the part fomented, and the pus gently pressed out.

Often the case is first seen when the pus has burrowed into the neck, making long fistulas or pipes. Here the treatment is difficult. The fistulas must be freely opened to their ends by a sharp scalpel, the bone scraped, if diseased, and the whole thoroughly washed and syringed every day with a cleansing and stimulating lotion, as—

No. 259.	Chloride of zinc,	30 grains.
	Water,	1 quart.

Or,

No 260.	Tincture of the chloride of iron,	1 oz.
	Water,	1 quart.

When the joint is attacked, the case is desperate, and the animal may as well be killed.

In less severe cases setons inserted from the original opening along the track and down to the bottom of the fistulas, and then brought out upon the opposite side of the poll, are very successful, and do away with the necessity of using the knife.

FISTULOUS WITHERS.

This injury closely resembles poll evil. It is caused by bruises from ill-fitting saddles, and those horses are most liable to it who have high withers.

Symptoms.—In the early stage there is an enlargement of the heads of the spinous processes with heat and tenderness. This continues and leads to the formation of an abscess; but as, on account of the position of the withers at the top of the horse in standing, the pus cannot escape, it sinks downward, burrowing in between the skin and the muscles, or

among the muscles themselves which connect the shoulder blade with the trunk. Consequently, the inflammation extends, there is serious lameness of the shoulder, and the animal suffers generally.

Treatment.—In the early stage, the spinous processes, as soon as they are noticed to be inflamed, must be protected from pressure and dressed with cooling lotions. Later, when it is evident that pus is formed, by the fluctuating feel of the abscess, it should be freely opened by an incision as low down as possible on the right side, as most horses lie down on that side, and the escape of the pus is thus favored. The abscess should be syringed with carbolic acid water (1 to 2), and dressed with a carbolic acid salve (1 to 8), or petroleum.

In older cases, where a fistula has already formed, running down into the shoulder, careful search should be made for its lowest pouch which contains the pus. This will be either before or behind the shoulder. A free incision should be made into it, and the fistula syringed and dressed as above. Sometimes a more active stimulus is required to make the sides of the fistula take on healthy action. A seton tape may then be passed through the fistula from end to end, and left there. Or the following injection may be freely injected into every part of the fistula, two or three times a weak:—

No. 261.	Chloride of zinc,	1 drachm.
	Water,	1 pint.

These measures, combined with general tonics and good care, will be quite certain to bring about good results.

ROTTEN BONE,—NECROSIS AND CARIES OF BONE.

Definition.—A decay of the bone, owing to its death from inflammation. It is called by veterinarians "necrosis," when it attacks the shaft or body of the bone, and "caries," when it is confined to its ends, at the joints (Williams).

Causes.—These, in nearly all instances, are wounds and injuries of some kind, or the result of the very severe inflammation which follows them. Thus the bone is liable to decay in founder, poll evil, after severe kicks, cracked or fractured bones, etc.

Symptoms.—Severe and painful inflammation in the part is followed by one or several abscesses, which break but do not heal, remaining as fistulas. The discharge at first may be odorless, but after a time gives off a peculiar and very fetid odor, easily recognized by one familiar with it, as proceeding from decaying bone. If a probe is carefully inserted into the fistula, and made to follow its course, it will reach the decayed bone, and give a dry grating feel to the finger.

Treatment.—The most prompt treatment of necrosis, when it is in a position to permit of it conveniently, is to cut freely down upon the decayed bone, scrape it clean with a scraper, remove all loose pieces, wash the wound with carbolic acid water or De Morgan's chloride of zinc lotion (No. 217), and treat the cut like any other wound.

This cannot always be done, for various reasons, and then the next best procedure is to open the fistulas so as to admit of throwing injections to their bottom, and wash them out once a day, for a week or two, with "Villate's Solution."

No. 262.

Sulphate of zinc,		
Sulphate of copper,	each,	½ oz.
Solution of subacetate of lead,		1 oz.
White wine vinegar,		6 ozs.

Use one part of this to ten of water, by means of a syringe.

The upper and lower jaws, from their exposed situation, and from the abuse of the bit with long levers, and from injuries to the teeth, and also the roof of the mouth, are parts especially liable to caries, the ulcers being inside the mouth. The sore caused is characteristic. There is a depression, indicating a loss of substance, which contains a fungous growth

of "proud flesh," which is not attached to the sides, but only to the bottom of the ulcer. There is a watery and offensive discharge, but as this flows inside the mouth and becomes mixed with the saliva, often the only circumstance which calls attention to the presence of the disease is the bleeding from the mouth when the bit is in place. The mouth is full of a slightly bloody pink froth.

This form of caries is best treated by ceasing to use the bit, and touching the sore repeatedly with the nitrate of silver stick, which should be pushed deeply into it and held for a second or two. By judiciously continuing this for a few weeks, taking care not to use the caustic more than enough to keep down the proud flesh, a cure can be effected without the necessity of cutting down and scraping the bone. Nevertheless, when time is an object, the latter is much the more expeditious plan. The horse should be cast, and chloroformed, the granulations removed with the knife, the dead bone scraped away, and the wound swabbed with the solution of chloride of zinc.

FROSTBITE.

This is caused by prolonged exposure to the cold, especially by standing in the snow, and in half-thawed slush, as is so often the case in the cities.

The skin of the part becomes weaker, turns of a purple color, is easily inflamed, cracks, and discharges a bloody-looking fluid.

In more severe and sudden cases the skin and underlying tissues become pale, insensible and shriveled. The skin, particularly on the heel, will slough across from side to side, forming a deep crack, a condition familiarly called "cracked heel."

Treatment.—Where the skin is unbroken, and the exposure has not been for a long enough time to destroy the

life of the part, it should be briskly rubbed with snow for five or ten minutes. The foot should then be put in a bucket of *cold* water, and the friction continued until there is a return of warmth.

The raw surfaces and sores which follow on neglected frost-bite are particularly slow to heal, on account of the diminished vitality of the tissues. Mr. Dun recommends as a valuable application—

No. 263. Extract of belladonna, 1 to 2 drachms.
Rub this up with an ounce of the petroleum ointment or lard, and apply twice a day.

It may advantageously be combined as follows :—

No. 264. Extract of belladonna, 1 drachm.
Ointment of red oxide of mercury, 1 oz.
Rub together and apply daily to the ulcerated patches.

BURNS AND SCALDS.

These are quite common in horses employed about iron works, factories and steam mills.

In all severe cases there is fever, often preceded by shivering, coldness of the ears and legs, prostration of strength, and a quick and feeble pulse. The surface of the burned part will become pale and leathery, or will crack, and a watery discharge will flow from it. Swelling and inflammation come next, and an effort of nature is made to separate the dead from the living tissues by suppuration.

The most troublesome burns in horses are about the shoulder and elbow, as, owing to the continual motion of these parts, a wound upon them is very slow to heal.

Treatment.—The traditional treatment of burns is, to smear them over, several times a day, with what is called Carron oil. It is made as follows :—

No. 265. Lime water,
Linseed oil, equal parts.
Mix, and apply direct to the burned surface, dredging flour over it, to thicken it.

A still better, and often a more easily obtainable, application is ordinary *bicarbonate of soda*—baking soda. This may be dredged directly on the part, or stirred up with water to a thick paste and laid over the burn. The relief it causes is immediate.

In milder burns, a cheap and very excellent application is, to paint the whole of the burned surface with several thick coats of ordinary *white lead paint.* On the large surfaces of horses and cattle, this is the most convenient of all dressings. After being well covered, carded cotton should be laid over the paint, and the whole covered by a moderately firm bandage. No further dressing is needed, as the pain is at once allayed, and the burned surface heals kindly under the impenetrable cover thus given it.

No. 266.	Alum, powdered,	2 oz.
	Water,	1 pint.

An excellent application for fresh burns and scalds. The part should be soaked with it, and cloths wet with it applied to the surface.

When the parts ulcerate, they should be well washed out with warm water, with a little carbolic acid in it, or with tar water, and the following dusted over the surface with a flour dredger:—

No. 267.	Oxide of zinc,	1 oz.
	Starch (or rye flour),	2 oz.

Whenever more moisture appears, this should be dredged on again, so as to keep the parts covered with a thick, dry crust.

STINGS AND BITES.

Hornets, wasps and bees often attack animals, and sometimes cause them serious injuries.

Solution of ammonia, or a weak carbolic acid wash (1 oz. to a quart of water), will promptly relieve the smarting.

Lime water, alone or containing a drachm of commercial carbolic acid to the pint, is very soothing; while others speak highly of the oil of lobelia, promptly applied.

HERNIA—RUPTURE—BURST.

Definition.—A protrusion of any portion of the bowels, or their coverings, through a rent or opening in the walls of the abdomen.

Causes.—Ruptures are quite common in the horse. They are often seen about the navel at birth, and disappear without any treatment, during the first year of life. Stallions are more liable to them than geldings. They may be owing to constitutional weakness in the walls of the belly; or to violent efforts and strains tearing the muscular structure; or to kicks, blows and similar violence.

Symptoms.—These differ as to the part of the abdominal wall which has given way. There is usually a visible tumor or bulging, which has a hollow sound on percussion, and on feeling it between the fingers the contents are felt to slip upon each other. Often, by properly directed pressure the gut is slipped back into the belly, and the tumor disappears, but returns as soon as the animal makes any exertion.

When the hernia is inflamed the tumor is tender, hot to the touch, and there are signs of colic, and often constipation. In the ruptures which take place in stallions when a part of the gut passes into the inguinal canal, there are symptoms of severe colic, which has the peculiarity that the animal seems relieved of the pain when he lies upon his back, a position he retains for half an hour at a time.

When the rupture is "strangulated," that is, when the gut is caught and pinched in a narrow slit in the abdominal walls, the suffering is very intense; the body is covered with cold sweat, the animal sighs, the eyes become bloodshot and the pupils wide and staring.

Treatment.—The general treatment of rupture is as follows:—

When the gut can be returned to the abdomen, a pad, such as a smooth piece of wood, should be placed over the part, and kept in position by a firm leather or rubber bandage, which will not slip, and which can be tightened. This should be worn for months, until the rent is healed.

When the hernia is inflamed and strangulated, the animal should be chloroformed to insensibility, and gentle and repeated efforts made to return the parts. This will often succeed if intelligent and persistent efforts are used. When returned, cold lotions should be applied, and a well-fitting bandage.

In case return is impossible, and the distress is severe, the skin must be opened down to the sack, taking great care not to cut into it, and a blunt-pointed bistoury be slipped up between the gut and the edges of the rent or slit in the abdominal walls and these edges cut and nicked very slightly, thus allowing the gut to be replaced. This is a safe, easy and successful operation, if one is well acquainted with the anatomy of the parts; but should only be tried as a last resort, in otherwise hopeless cases, by a person who has no special knowledge of the kind.

CHOKING.

This accident is, in the horse, usually caused by some article of food, as a potatoe, apple, or piece of dry fodder, lodging in the gullet. A common substance in England to cause choking is an egg, many grooms there having the absurd idea that an egg given whole has a beneficial effect on the horse's condition.

The symptoms in choking are violent efforts at swallowing, with the throat and neck spasmodically drawn up. Sometimes the offending substance is visible to the eye, or to be

felt by the hand passed down the front of the neck. Should the animal try to swallow, the fluid is returned by the nostrils. There are coughing, slavering, a look of great distress in the face, cold sweats and exhaustion.

Treatment.—Whenever the obstacle can be reached with the hand or with a pair of forceps, it is to be withdrawn through the mouth. The tongue should be pulled well out of the mouth, and this kept well opened, while the operator removes the substance.

When this cannot be done, and the object can be felt from the outside, it is to be loosened by being gently pushed upward and downward. Sometimes this maneuver can be aided by having the animal swallow some sweet oil. This, or some other fluid should always be used if the object is dry, as fodder, chaff, etc.

If this plan fails also, it becomes necessary to use a *probang* and push the offending substance down into the stomach. This is a difficult job in the horse, though much less so in cattle. The following rules should be observed:—

Directions for Using the Probang.

1. Raise the animal's nose so that the mouth and throat are in a straight line.

2. Keep the neck straight.

3. Push the probang gently down the gullet, taking care not to injure, still less to enter, the windpipe.

4. When the end of the probang reaches the object, do *not* push strong upon it, but gently, and for but a few seconds at a time, then again after a few seconds of rest.

In cases where the object is so solidly caught in the gullet that even the probang fails, the next resource is to cut down upon it and remove it. An assistant presses the off side of the neck, so as to make it bulge as much as possible on the

near side where the operator stands. The latter, with one bold cut of a sharp knife, divides the skin gullet and tissues down to the offending substance, making a cut long enough to remove it. This should be promptly done, and the edges of the cut brought together and stitched, first, the walls of the gullet, with fine thread (or better with catgut), and over them the skin. For several days, or a week, the animal should have only milk and water, or thin slops. But it should be added that this operation is often followed by a permanent narrowing or stricture of the gullet, which may prevent the use of solid food for the rest of the animal's life.

CHAPTER X.

DISEASES OF THE EYES.

Inflammation of the Eyes—Conjunctivitis.
Periodic Ophthalmia—Moon Blindness.
White Spot—Eye Spot—Albugo.

INFLAMMATION OF THE EYES—CONJUNCTIVITIS.

Definition.—An inflammation of the outer covering of the eye-ball, and the lining membrane of the eyelids.

Causes.—These may be the stroke of a whip, a blow, a cold, or some foreign substance getting into the eye and irritating it.

Symptoms.—The eyelids are swollen, and partly closed, and the tears flow down the cheeks. If the eyelids are turned up, their lining membrane will be found red and bloodshot, the surface of the eye itself also red, and the pupil dull looking, while there may be the signs of some injury visible, or of some irritating substance.

Treatment.—Of course the first step is to remove any splinter, hay seed, piece of chaff or other substance visible in the eye. A strong feather is often convenient for this purpose, or a small pair of forceps. If there is very much inflammation, it is well to take blood from the *angular vein*, which is seen traversing the face, immediately below the eye. The organ can then be covered with soft cloths, and these repeatedly wet with clean cool water.

Should the inflammation or the injury be so severe that it has involved the inner structures of the eye, great advantage will be derived from smearing the eyebrows and outside of the eyelids with—

No. 268.	Extract of belladonna,	1 oz,
	Honey,	½ oz.

Mix well together, for an ointment.

Or three or four drops of the following may be dropped into the eye twice a day:—

No, 269.	Atropia,	4 grains.
	Water,	1 oz.

Mix for an eye lotion.

Do *not* use that common eye wash, sugar of lead and water, as it leaves a dull leaden deposit on the eye ball, which is a permanent blemish. There are plenty of other lotions for the purpose, which are far better, as for example—

No. 270.	Sulphate of zinc,	3 grains.
	Water,	1 oz.
No. 271.	Powdered alum,	6 grains.
	Water,	1 oz.

Both the above are mild astringents, very well suited for chronic cases of sore eyes. When there is slight but active inflammation, a soothing eye wash is better, as—

No. 272.	Sassafras pith,	2 oz.
	Cold water,	1 pint.

Let it stand for a few hours, and then apply cold to the inflamed organ.

Another sedative eye wash is—

No. 273.	Solution of subacetate of lead,	½ oz.
	Extract of belladonna,	20 grains.
	Water,	1 pint.

Or—

No. 274.	Laudanum,	2 drachms.
	Extract of belladonna,	1 drachm.
	Water,	1 pint.

PERIODIC OPHTHALMIA—MOON BLINDNESS.

Definition.—A constitutional and probably malarial or rheumatic affection, leading to repeated attacks of inflammation in the eye, and finally to cataract and blindness.

Symptoms.—The disease derives its name of "moon blindness," because the attacks come on suddenly and generally at night. As it is considered incurable, and yet between the attacks, which usually last for a week or two, the horse can see tolerably well, it is of chief importance to be able to recognize the signs of the liability to it.

Mr. Percival says that when a horse presents several of the following symptoms, he is probably subject to the disease:—A sunken or dull look of one eye compared to the other; prominence of the winking membrane; pinkness of the white of the eye; a watery state of the eye; dimness or cloudiness of the pupil, especially at its edges, and dullness or discoloration of the center; the pupil of one eye smaller than that of the other; haziness, milkiness, or a small white speck to be seen in the pupil; a wrinkled or furrowed appearance of the upper lid or eyebrow. Where any two or three of these are found, the horse is probably liable to moon blindness.

To examine an eye for *cataract*, the horse's head should be turned away from a strong light, the eye shaded with a black hat, and if necessary the eye dilated by rubbing some belladonna on the lid.

Treatment.—Moonblindness is at times no doubt of malarial origin, as we might judge from its periodic character, and in all cases a full and early trial should be made of the specific remedies for malarial diseases, especially Peruvian bark or quinine and arsenic.

No. 275.	Powdered Peruvian bark,	½ oz.
	Sulphate of iron,	1 drachm.

Give twice or three times a day, and double the dose when the attack is expected.

The French veterinary surgeons claim many cures by this method. Arsenic can be given, as Fowler's solution of arsenic, an ounce once a day in the water for several weeks, suspending a few days now and then.

When this fails, and we are forced back to the rheumatic theory of the affection, we should attack it with a steady course of iodide of potash constitutionally, keeping down the inflammation of the eye by belladonna ointment and eye washes, as recommended on page 249.

The old practitioners taught that moon blindness is due to the presence of the "wolf teeth," and their first step in the treatment was to extract them. This notion does not receive any countenance from the modern school; but no harm can be done, by following the traditions in this respect; and in human surgery the close sympathy of the teeth and the eyes is often observed.

WHITE SPOT—EYE SPOT—ALBUGO.

Definition.—A bluish or pearly white spot on the pupil of the eye, the result of inflammation, and generally causing some defect of sight.

These spots are blemishes which detract considerably from the value of horses, more often than they should do, for they may interfere little or none with the sight.

Some veterinarians attempt to remove them by blowing irritating matters through a quill into the eye. This rude and barbarous plan does generally more harm than good. They never entirely disappear, but they may be lessened by occasional light touches with a stick of nitrate of silver.

CHAPTER XI.

DISEASES OF THE SKIN.

Ringworm.
Nettle Rash—Surfeit—Urticaria.
Moist Tetter—Humid Tetter—Eczema.
Mallenders and Sallenders—Psoriasis of the Carpus and the Tarsus.
Warbles—Grubs—Sitfasts.
Mange—Itch.
Lice.

RINGWORM.

There are two forms of ringworm in the horse, the one known by surgeons as *herpes*, which is an affection of slight importance and not contagious; the other called *tinea* which is contagious, obstinate and disfiguring.

Herpes is characterized by an eruption of small blisters the size of a grain of wheat, on inflamed patches of skin which assume a circular form. It is usually owing to indigestion, or being shut up in a railroad car, or the hold of a ship in close or foul apartments.

Contagious ringworm is, on the contrary, found on well-cared-for animals as well as neglected ones. It attacks and destroys the hairs, leaving patches of baldness usually of a circular form, the surface of the patch being covered with fine, white, bran-like scales. The hairs around the edges first become dry and brittle, and then break off, and then the patch gradually extends. This form of ringworm is owing to a minute parasite on the skin, supposed to be a plant.

Treatment.—For simple ringworms or herpes, it is enough to bathe the parts with a sugar of lead lotion, as:

No. 276.	Acetate of lead,	½ oz.
	Water,	1 pt.

And to give the horse a smart purge. After this tonics will be required (as No. 20) if the horse is weak and out of condition; and if there are scratches and small ulcers on the patch it should be rubbed with a stimulating ointment, as,

No. 277.	Nitrate of silver,	10 grs.
	Lard,	1 oz.

When very obstinate, a blister can be applied directly over the patch which will be pretty sure to effect a cure.

The treatment of the contagious or branny variety consists in first washing the patches thoroughly with soft soap or weak lye, and then rubbing them with the following ointment:—

No. 278.	Iodine,	½ drachm.
	Iodide of potash,	1 drachm.
	Cosmoline,	1 oz.

Mix for an ointment, to be used every day.

The stable should be thoroughly cleaned and whitewashed, the harness and collars washed with strong soap and water, and then brushed over with a solution of corrosive sublimate (one drachm to a pint of water), and the blankets worn on the animal boiled.

Instead of the iodine ointment we may paint the part with the following, which is highly recommended by Mr. Dun:

No. 279.	Carbolic acid,	1 part,
	Acetic acid,	20 parts.

Mix for local use.

Or with tincture of the chloride of iron; or,

No. 280.	Corrosive sublimate,	2 grs.
	Water,	1 oz.

NETTLE RASH—SURFEIT—URTICARIA.

This is a frequent form of skin disease in the horse, and consists of an eruption of small elastic lumps, roundish or oblong in shape, and attended with itching.

The lumps rise quickly and upon the greater part of the body, generally beginning upon the neck, and frequently disappearing as suddenly as they come. They are unequal in size, some no larger than grains of wheat, others as large as beans, and flattened upon the surface.

The most singular feature of this eruption is the suddenness of its appearance. Sometimes it will break out over all parts of the body in a few minutes; and it will disappear with equal promptness.

The cause of the disease is some disturbance of the digestion; it often appears in horses when they are first turned out to grass in the spring; and sometimes a draught of cold water when they are heated will bring it out on those predisposed to it. It entails no serious consequences.

Treatment.—As a rule all that is necessary is to give a mild purge, and to relieve the itching bathe the eruption with a wash of sugar of lead (one drachm to the pint of water).

MOIST TETTER—HUMID TETTER—ECZEMA.

This is a non-contagious skin disease, which usually begins about the neck, shoulder, back and thighs.

The onset is sudden, and the animal is seen to rub and scratch himself to relieve itching. On examination the skin is found to be red and inflamed, often scratched and torn by the efforts of the animal. Small blisters or vesides will be noticed on portions of the skin not lacerated by these efforts, which eruptions break and discharge a watery fluid, keeping the surface moist.

As a rule, it is a summer disease, and some horses have a return of it season after season; and it is often difficult to assign any other cause for it than that it is constitutional.

Nearly always this kind of tetter is confounded with the mange, which it very closely resembles in appearance; but it differs from it in two important particulars, first, that it is not contagious, and secondly, that it is not caused by an insect.

Treatment.—This should be begun with a change of diet and a purge of aloes. If after the purge, the bowels are found to be irregular, and feces ill smelling, it is well to give the following:—

No. 281.	Bisulphite of soda,	1 oz.
	Powdered gentian,	½ oz.

Make a ball, to give night and morning.

The most effectual internal remedy is *arsenic*. This can be advantageously given, as Fowler's solution of arsenic, one ounce once or twice a day.

For the treatment of the eruption itself, it is necessary first to remove the scabs and crusts, by first soaking the parts with sweet oil for a few hours, then washing with soap and water. If the hair is long, it must be clipped, and all dust and dirt removed. Then the whole of the diseased surface, and a large space of the healthy skin around, should be covered with the following:—

No. 282.	Flour of sulphur,	½ lb.
	Carbonate of potash,	¼ lb.
	Carbolic acid,	1 oz.
	Lard,	
	Olive oil, each	2 lbs.

Mix thoroughly with the aid of gentle heat.

This is to be left on the skin two or three days, and then washed off with strong soap and water.

Another very useful, cheap and handy remedy is tar ointment, made as follows:—

No. 233. Tar,
Lard, equal parts.
Mix well together.

This should be used in the same manner as above.

For this and other itching skin disorders, the following is an excellent combination:—

No. 284. Soft soap,
Tar,
Alcohol (or whiskey), equal parts.
Used for painting on the parts twice a day.

MALLENDERS AND SALLENDERS—PSORIASIS OF THE CARPUS AND THE TARSUS.

This is a common and troublesome disease of the skin above the feet in horses. At first it generally begins very much as a moist tetter (eczema), but as the eruption becomes persistent, the discharge of watery fluid dries up, and the parts become covered with hard crusts and scabs.

Horses which are otherwise healthy are most liable to the disease, and it does not extend beyond the bends of the limbs. But the eruptions are unsightly, they sometimes crack and inflame, and therefore they lower the value of the animal. Unfortunately, it is by no means an easy matter to cure them.

Treatment.—If there is indigestion or constipation, the food of the animal should be carefully regulated, and he should have a moderate purge. Next, he should have with his drink an ounce of Fowler's solution of arsenic, once or twice a day.

The sore spots should be washed thoroughly with soap and warm water, touched lightly with a stick of nitrate of silver to freshen them up,, and covered with pure wood tar. This procedure should be repeated twice a week, and may be said to be a "sure cure."

Many ointments are recommended, of which we may mention that of Mr. Youatt:—

No. 285.	Acetate of lead,	1 oz.
	Tar,	2 oz.
	Lard,	6 oz.

Mix, and apply to the part. Give a diuretic dose occasionally, to act on the system.

Another application is:—

No. 286.	Powdered red precipitate,	2 drachms.
	Lard,	2 ozs.

Mix for an ointment.

Or,

No. 287.	Powdered camphor,	1 drachm.
	Acetate of lead,	½ drachm.
	Mercurial ointment,	1 oz.

For an ointment, to be applied after washing with soap and water.

WARBLES—GRUBS—SITFASTS.

These names are all applied to different forms of the skin disease, known to physicians as *acne*. It is characterized by the presence of small hard lumps beneath the skin, originating in swelling of the glands at the root of the hair. They are especially frequent on the withers, back and neck, and at the root of the mane and tail. They are more often found in the spring of the year, and on parts of the skin which are chafed by the harness.

The tops of these inflamed follicles suppurate or become rubbed off, leading to small ulcers, slow to heal, and of an angry appearance. Where constantly irritated by the harness or saddle they may mortify, and the skin assume a hard, horny or leathery appearance in the center, with an inflamed ring around the whitish central patch. This is familiarly known as a "sitfast" on account of the difficulty experienced in its removal.

Treatment.—In the simple varieties, where the pimples are ulcerating, the repeated application of poultices is very useful. Internally, the animal should have an ounce of sulphur mixed with his feed every morning. Sometimes this plan fails, and then it is well to rub the sores with a stimulating ointment, one of the best of which is that of the iodide of mercury (No. 239).

For the treatment of sitfast the only satisfactory method is carefully to dissect out the hard, dead piece of skin in the center of the ulcer, and dress the whole with a mild carbolic acid ointment, as,

No. 288.	Carbolic acid,	1 drachm.
	Lard,	3 ozs.

Mix and apply on rags.

Or, cover the wound with crude petroleum. Blisters and caustic, recommended by some, are of no use.

Sometimes they can be softened by the following ointment:

No. 289.	Gum ammoniac,	4 ozs.
	Mercurial ointment,	8 ozs.
	Oil of turpentine,	10 ozs.

Mix with gentle heat and apply on rags.

MANGE—ITCH.

Of all skin diseases on the lower animals, this is by far the most frequent, and by far the most to be dreaded, on account of its contagiousness. Any animal that has it should be shut off from others and active measures taken to clean thoroughly every blanket, every piece of harness, brush, curry-comb or other utensil that has touched him.

The mange or itch is characterized in all its forms by itching, scurfiness, thinness and loss of the hair on the affected part, and a surface torn and lacerated by scratching and rubbing, moist from a flow of thin, watery matter, or covered with scabs and crusts, caused by the drying of this exuda-

tion, and the presence of dust, dirt and skin scales becoming entangled and matted in the hairs. The parts of the animal most frequently attacked are the legs, and the sides and upper border of the neck, and the root of the tail.

The cause of the mange is the presence of insects, which live in or upon the skin, and find their food in the watery discharge which their bites cause to flow forth. These insects are of several species on each animal, some living on, some in the skin. They are hardly visible to the naked eye, and are often very difficult to point out when present. They have been named and described by naturalists, but it is not necessary for practical purposes that we should enter into an explanation of their forms and habits. The symptoms they cause, and the treatment they require, are similar or the same.

Treatment.—In all cases the utmost precautions should be taken, as above stated, to prevent the disease spreading. As an application to the mangy spots, many prefer the old-fashioned sulphur ointment:—

No. 290.	Flour of sulphur,	½ lb.
	Lard,	1 lb.

Mix thoroughly, and apply once or twice daily, rubbing it in well.

As a sulphur wash of a very effectual nature, the following will be found valuable:—

No. 291.	Flour of sulphur,	2 lbs.
	Quick lime,	1 lb.
	Water,	2 gallons.

Boil together, stirring until the ingredients are combined. Bathe the parts with it several times a day.

For horse mange some prefer ointment of stavesacre made as follows:—

No. 292.	Powdered stavesacre,	2 oz.
	Lard,	8 oz.
	Olive oil,	1 oz.

Mix at a gentle heat.

Whatever remedy is applied, the parts should first be oiled and washed with warm soap and water, to remove the crusts, dirt and scabs, before the ointment is applied, or otherwise it will not reach the insects, especially the varieties which burrow into the skin.

As a serviceable mange dressing, Mr. Finlay Dun speaks well of—

No. 293.	Iodine,	½ oz.
	Iodide of potash,	¼ oz.
	Tar,	1 oz.
	Lard,	8 oz.

Mix for an ointment.

No. 294.	White hellebore,	
	Tobacco, each	2 oz.
	Water,	3 pints.

Boil, strain, and when cold add a pint of fresh lime water.

No. 295.	Flour of sulphur,	
	Oil of turpentine, each	4 oz.
	Tar,	8 oz.

Wash the parts with soft soap, dry them, and apply the above.

LICE.

Poor, half-starved and old animals are very liable to become lousy. This is best treated by clipping them, giving them good food and tonics, and washing the skin with a decoction of stavesacre:—

No. 296.	Powdered stavesacre seed,	2 oz.
	Water,	1 quart,

Boil for twenty minutes.

Care should be taken that the animal does not lick this from the skin.

Horses which are stabled in hen-roosts are liable to be attacked with chicken lice, which produce an intense itching, sometimes setting the poor beast nearly frantic. The treatment is to remove the chickens, whitewash the stable, and

wash the horse with a decoction of tobacco or of stavesacre (No. 296), or rub with this mixture :—

No. 297.	Scotch snuff,	2 oz.
	Lard,	6 oz.

Mix well together.

Hot water poured on crude petroleum, well stirred and allowed to settle; or poured on quick lime, 4 oz. to the gallon, will destroy these parasites. The following is also an excellent, but poisonous preparation :—

No. 298.	Bruised cocculus indicus berries,	2 oz.
	Boiling water.	1 gallon.

With this the skin and hair may be thoroughly mopped.

No. 299.	Calomel,	1 drachm.
	Petroleum ointment,	1 oz.

This both allays the irritation of the skin and destroys the vermin.

No. 300.	Corrosive sublimate,	3 to 6 grains.
	Petroleum ointment,	1 oz.

A very efficient, but poisonous remedy.

No. 301.	Oil of turpentine,	1 part.
	Olive oil,	3 parts.

Mix for an ointment.

PART III.

Diseases of Cattle, Sheep and Swine.

INTRODUCTORY.

General Remarks on the Diseases of Cattle, and their Treatment.

Peculiarities of the Action of Medicines on Cattle.

There are a number of diseases which in general outline and management are nearly or quite the same in the two large quadrupeds, the horse and the ox. As previously noted, (page 83), a number of these will be found discussed under the Diseases of the Horse. There remains, however, a large class of maladies which are either peculiar to cattle, or present peculiar traits in them, which demand separate discussion; and to these this Part will be devoted, as also to the consideration of the less known, though really not less interesting, sicknesses of sheep and swine. We begin with some

GENERAL REMARKS ON THE DISEASES OF CATTLE, AND THEIR TREATMENT.

The purposes for which cattle have been domesticated, and their characteristics as ruminating animals, lead to several

peculiarities in the diseases to which they are subject, and the effect of medicines upon them.

Unlike the horse, they are never prized for their speed, so that lamenesses and disorders of the "wind" are much less frequent and less important; unlike him again, their food is not regulated to insure the utmost muscular power with the least accumulation of fat, but just the reverse. Cattle are naturally plethoric, slow of motion, and averse to much exercise; and as they are generally under a stimulating and forcing system of diet, they become peculiarly subject to all those diseases which are brought on by excessive richness of the blood.

Their tolerance of disease is also much less than that of the horse. They do not bear pain with nearly so much fortitude as that nobler animal; and when continued for some time, it preys upon them speedily and injuriously, as may constantly be seen in painful foot affections. Moreover, their courage to bear suffering is but little, and they readily yield to despair and become indifferent to life. Often they refuse to rise when perfectly able to do so, and require energetic measures to force them on their feet. For this reason also they demand tonic medicines more freely and earlier after acute disease than is necessary in the horse.

Another result of this lesser vitality is their proneness to local disease-producing influences. It is well known that they do not thrive well and are more subject to diseases when pastured in low-lying, swampy fields, and on rank grass. Epidemics are both numerous and destructive among them. Indeed, contagious and infectious maladies of various kinds are by far the most dreaded of all forms of disease with them, and have repeatedly desolated the herds of whole continents. Even the accident of abortion in pregnancy puts on an epidemic form in cows, and is a source of frequent anxiety to possessors of dairies.

The richness of the blood and general plethora predispose them to glandular swellings, ulcers, and especially mortification and gangrene. It is an acknowledged fact that although the flesh of the bullock is one of the most esteemed foods of the human species, there is no animal in which gangrenous ulcers and malignant forms of carbuncular disease are so numerous or so destructively poisonous.

The gullet of the ox is several times larger than that of the horse; but owing to the greater development of the bones of the nose (the ethmoid and turbinated bones), the pharynx, or upper part of the throat is smaller, and the windpipe is considerably less. From these anatomical differences it arises that inflammations of the upper throat are much more liable to produce suffocation than they are in the horse, and demand, therefore, early and active attention, or the performance of tracheotomy more promptly. (See page 112.)

For what reason has not been definitely ascertained, true inflammation of the lungs (pneumonia) is not nearly so frequent in cattle as in the horse. What is usually so called in them is an inflammation of the small air tubes of the lung, and is known to medical men as "capillary bronchitis." Pleurisy, on the other hand, occurs much oftener than in the horse, and the compound disease called pleuro-pneumonia, where there is along with pleurisy scattered masses of inflamed tissue in the lung, is at times a malignant epidemic.

The most terrible of lung diseases in the human race, consumption or pulmonary phthisis, is hardly known in horses, but is very common in some breeds of cattle, and in milk cows after neglected colds, pneumonia or pleurisy. It is closely associated with scrofula, which is a hereditary taint of the blood, far more common in the best breeds of cattle than it is in the hog, from which animal the name is derived (Latin, *scrofa*, a sow).

PECULIARITIES OF THE ACTION OF MEDICINE ON CATTLE.

There are several peculiarities in the action of medicines on cattle which the veterinarian takes into account. They are chiefly referable to the construction of their stomach in four divisions, only the last one of which corresponds in its action to the single stomach of the horse and of man. The first and third compartment always contain food and in large quantity, and until the medicines have passed through these and have reached the fourth stomach, they have little or no effect whatever. It is a common but erroneous notion, as has been shown by Mr. Finlay Dun, that medicines when poured very slowly down a cow's throat, pass, like the ruminated food, direct to the fourth stomach. On the contrary, they pass through the first, second and third stomachs first.

Accordingly it happens, and not unfrequently, and particularly in some diseases of an inflammatory nature, that the medicines remain in the first or third stomach for a long while after they are administered. Dose after dose is given, and their lack of action is attributed to the obstinacy of the constipation or the inertness of the medicine. At length the rumen is excited to action, and the collected doses are expelled into the fourth stomach and intestines, exciting violent and perhaps fatal action.

To avoid this, two precautions are to be observed :—

1. Never give medicine to cattle in a solid form, as balls or pills, but in a liquid state, as in drenches, and with plenty of water, a quart or two at a time.

2. Always combine with cattle medicine which is desired to act promptly, some stimulating and aromatic substance which will incite the partly insensible coat of the rumen to action. For this purpose, ginger, carraway seed in powder, and flour of mustard, are generally preferred.

The *dose* of medicines for cattle is nearly double the amounts used for horses, the formation of the stomach and the phlegmatic temperament of the ox rendering him not readily affected by medicinal substances. Their kidneys and skin are less easily acted on than the corresponding organs in horses; and they resist the action both of stimulants and tonics.

Long experience has given the preference to certain drugs for cattle, different from those administered to horses. Thus aloes, which is the favorite purgative for the horse, acts irregularly and feebly in the ox and cow. For them saline cathartics are altogether preferable, either sulphate of magnesia (epsom salt), sulphate of soda (glauber salt), or common salt; or, as many prefer, a mixture of the three in equal parts. A pound of such a mixture in a quart or two of water, with a teaspoonful or two of essence of ginger, or a dash of cayenne pepper, constitutes a most efficient and dependable purge. Linseed and castor oils, either of which may be strengthened by the addition of croton oil, are also excellent purges. To exert a continued laxative effect, sulphur is a very useful means.

Mercury in any form must be given to cattle with greater caution than to horses, as, whether it be as calomel internally or as mercurial ointment rubbed on the skin, it salivates and mercurializes them easily. Especially we would advise not using mercury in any shape with milk cows. If pregnant, they are more apt to abort; and the mercury passing into the tissues is secreted with the milk, and is thus conveyed to the human race. A French author states that he has witnessed lambs die from mercurial poisoning, when the ewes had been rubbed with mercurial ointment to destroy insects.

CHAPTER I.

THE CONTAGIOUS OR EPIDEMIC DISEASES OF CATTLE.

The Cattle Plague—Rinderpest—Contagious Enteric Fever of Cattle.
Pleuro-Pneumonia—Contagious Lung Fever.
Foot and Mouth Disease—Epizootic Aphthae—Contagious Eczema.
Charbon—Black Quarter—Quarter Ill—Contagious Anthrax—Bloody Murrain.
Splenic Fever—Texas Cattle Disease—Spanish Fever.
Cow-pox—Smallpox of Cattle—Variola Vaccina.

THE CATTLE PLAGUE—RINDERPEST—CONTAGIOUS ENTERIC FEVER OF CATTLE.

Definition.—A malignant contagious fever originating on the plains of Asiatic Russia, and conveyed by the exportation of cattle to other countries. It is essentially a disease of the bovine family, but has been known to attack sheep, goats and deer.

Causes.—This formidable disease is believed to be owing to a specific poison which is given off by the animal suffering from it, or which may be conveyed by a healthy animal from a locality where the disease is prevailing. This last fact has been abundantly proven, and is of prime importance.

Symptoms.—The time which elapses between exposure to the poison and the outbreak of the disease is from three days to a week; and the course of the disease to its usually fatal termination is about a week. But within two days of exposure the fever often begins, although its presence may not be noticed, unless the thermometer is used.

The average temperature of a healthy ox is 101° Fahren-

heit. It has been found that when an animal has been exposed to the poison of the cattle plague, and is about to take the disease, the thermometer rises to 103° or 104°, while no other symptom of disease is present.

About two days after this rise of the temperature the breath becomes ill-smelling, and the mouth, as well as the vagina in cows, will be found unnaturally red and hot to the touch, and with a slight eruption of minute blisters on its surface, about the size of a pin's head. These are both very characteristic symptoms.

Even at this stage of the disease a day or two may still pass by without the animal showing any very positive signs of being sick. But after the fourth day from the beginning of these warnings is past, the constitution is thoroughly saturated with the poison. Then the head begins to droop, the ears hang, the pulse weakens, the breathing is difficult, and there is a foul discharge from the eyes, nose and mouth.

The next day, usually the sixth, all these symptoms grow worse, the pulse becomes hardly perceptible, the breath is drawn with effort, and there is great weakness in the limbs. If now the temperature is taken with the thermometer, it will be found below the natural heat, probably at 96° or 98° Fah.

Death usually occurs on the seventh day from the time the temperature first begins to rise.

Of course, in different epidemics, and in different herds, there is considerable variation from the above description; but they are those of degree only, and it will serve as a correct type of them all.

Treatment.—There is but one treatment for this terrible disease, and that is the preventive one. When it appears in a country, all importations of cattle, sheep, or goats from that country should be positively forbidden by government; when it attacks even a single steer of a herd, not only that steer,

but every member of the herd should be slaughtered before the sun goes down, and the most energetic disinfecting measures be taken with every thing about the premises.

No form of disease in the lower animals is more fatal and more contagious than this; and any hesitation in "stamping it out" at the very first will entail the loss of millions and millions of dollars' worth of stock.

Fortunately, it has never had more than a slight foothold in this country; but we are exposed to it almost every year, and should be prepared to deal with it summarily and effectually when it is introduced.

Of the medicines which have been tried in its treatment—and about all known to veterinary pharmacy have been experimented with—the most favorable reports have been from bisulphite of soda, chlorate of potash, sulphate of iron and carbolic acid, given by full and frequent doses by the mouth and by injection into the veins.

PLEURO-PNEUMONIA—CONTAGIOUS LUNG FEVER.

Definition.—A contagious fever of cattle, accompanied by great prostration, together with local inflammation and other diseased changes in the lungs and their envelopes.

Cause.—This no doubt is a specific blood poison. It is often slow in its development, several weeks or even months elapsing between the exposure to the poison and the onset of the disease. In its more malignant phases, and particularly at the beginning of an epidemic, it runs a rapid course, destroying life in the course of a few days; but generally occupies from four to six weeks.

Symptoms.—The earliest symptoms are apt to pass unnoticed. The first that can be observed is a rise of temperature to 103°–106°, indicated by the thermometer in the rectum. The moment this is observed when pleuro-pneu-

monia is about, the animal should be separated from the herd, disinfectants used, and a watch kept for the next developments of the disease.

These are slight shivering and staring coat; some loss of appetite; scanty milk; an occasional dry and hard cough; irregular chewing of the cud; bowels rather constipated; urine less than usual, and high or dark in color.

These insidious symptoms may continue several days without the appearance of others of a more marked character. Sometimes there is tenderness on pressure between the ribs over the lungs, as evinced by a slight wince or groan. The cough now increases, the breathing is more frequent, and when the animal stands the elbows are turned out, the nose is extended, the back arched, and the hind legs drawn up under the body. Later on, there is a watery or mattery discharge from the eyes and nose, there is rapid loss of flesh, the animal is hide bound, and there is either obstinate constipation or a violent watery diarrhea of fetid matter, which rapidly weakens and destroys life.

The symptoms on percussing over the lungs are in the earlier stages a clear or resonant sound, which, as the disease advances, gives way to a dull, heavy one. On listening in the first stage, a dry, creaking sound is heard, caused by the inflamed surface of the lung and its covering (the pleura) rubbing against each other. Later, there are irregular whistling or rough breathing sounds, easily distinguished from the sounds caused by the lungs in health.

The rule is generally positive that where both lungs are affected the animal dies.

Treatment.—It cannot be said that the medical treatment of pleuro-pneumonia is very satisfactory. Many remedies have been recommended from time to time, but the use of them in practice has not met the expectations created.

Perhaps the most prudent course is to put the animal in

the best sanitary surroundings possible, and *avoid* most scrupulously either bleeding, or blistering, or putting in setons. Give no lowering medicine, neither aconite nor tartar emetic. If constipation is decided, a small dose of salts will remove it.

When there is much swelling or "bloating" of the stomach, it may be removed by carbonate of ammonia, one ounce, in gruel, repeated, if necessary.

The diet should be low, and some writers recommend no solid food at all, but feeding on thin gruel, linseed tea, or slippery elm bark water.

Slight diarrhea is believed often to be of advantage, and should not be checked; but when it is violent it may be held up with some astringent, as

No. 302.	Gallic acid,	½ oz.
	Gruel,	½ pint.

Or,

No. 303.	Alum in powder,	½ oz.
	Milk,	1 quart.

When the worst of the attack is over it is well to hasten the return to health by mixing a teaspoonful of sulphate of iron with the food several times a day.

Mr. Finlay Dun has found ounce doses of the acid sulphite of soda, given twice daily, to lower the temperature and ease the breathing. In the second stage of the disease he has also derived decided benefit by giving, every three or four hours, one or two ounces of whiskey or of oil of turpentine.

For a tonic mixture Mr. Jekyll recommends:—

No. 304.	Sulphate of copper,	1 part.
	Water,	4 parts.

Dissolve and add solution of ammonia until it begins to precipitate. The dose is half an ounce every six or eight hours, as soon as the feverish symptoms have abated.

Prof. John Gamgee, who made an elaborate report on this disease to the United States Government, published by the

Department of Agriculture in 1871, joins in absolute condemnation of purgatives and bleeding. If the case is seen and attended to early in the disease, he believes its progress may be checked by active internal astringents. He places the whole herd in which the malady has appeared on regular daily doses of *sulphate of iron*, allowing about half a drachm to a drachm to a bullock, mixed with an equal amount of bruised coriander seeds, given in some bran, the better to disguise the iron. Prof. Gamgee has uniformly found its use followed by a mitigation of the cough and a disappearance of the disease in the herd.

When the case has progressed to the second stage of the malady, he believes that light but nutritious food, copious warm water injections, and the use of a stimulant, such as half an ounce of carbonate of ammonia in a quart of linseed tea, two or three times a day, the most hopeful plan.

But when the lung is already filled and solidified by the progress of the inflammation, the advice of this author is to leave the case to nature. If both lungs are involved, there is substantially no hope; but if only one is implicated, recovery occasionally takes place.

Blisters, setons, rowels and cauterization, are all out of place in the acute stage, though they may be applied after the fever has abated in some instances. For the cough and debility following the disease, a tonic used by Prof. Gamgee is:

No. 305.	Oxide of manganese,	
	Iron filings, each	½ oz.
	Tincture of gentian,	1½ oz.
	Water,	1 pint.

To be given daily in gruel.

Or the sulphate of iron, as mentioned above.

The *carbolic acid treatment* has been unquestionably of considerable success in various instances. It may be carried out as follows:—

No. 306.	Carbolic acid (pure),	1 drachm
	Water,	1 pint.

For one dose three time a day.

The other preparations of the acid, as the carbolate of soda, etc., may also be used, but the above is more direct and simpler.

FOOT-AND-MOUTH DISEASE—EPIZOOTIC APHTHÆ—CONTAGIOUS ECZEMA.

Definition.—A highly contagious, but rarely fatal, febrile disease, occurring in cattle and sheep, and capable of transmission to pigs and man; it is characterized by an eruption of small blisters in the mouth, between the clefts of the hoof, and along its upper margin at the coronet.

Causes.—The cause is a specific poison supposed by some to be of an animal, by others of a vegetable nature. It remains in the system from one to four days before it produces the characteristic symptoms.

The foot-and-mouth disease was first introduced into the United States in 1869, and has prevailed more or less ever since.

Symptoms.—These are, at first, an increase of temperature in the body, shortly followed by an eruption of small blisters, about the size of a ten-cent piece, on the tongue, inside the lips, on the roof of the mouth and sometimes on the udder. Smaller blisters also make their appearance in the fissure of the feet, and around the coronets and heels.

There are some lameness, a flow of water from the mouth and eyes, constant movements of the lips, and difficulty in swallowing.

The blisters soon break and leave behind raw surfaces, which either proceed to healing, or, in severe cases, form ulcers and become gangrenous.

Treatment.—Mild cases require but little treatment, as they tend to recovery after a week or two, and medicine does little to hasten it. While the mouth is sore, the animal should have plenty of water, with an ounce of saltpetre, or of chlorate of potash, or of powdered borax, dissolved in each bucketful. The food should be slops.

The feet should be kept clean, and washed frequently with a mixture like the following:

No. 307.	Acetate of lead,	½ oz.
	Carbolic acid,	1 oz.
	Water,	1 quart.

Mix. Dip pieces of lint or tow in this, and bind them to the foot and between the toes with a bandage.

Where there is extreme weakness, whiskey should be given.

The bowels usually become loose as the disease advances, but this condition should not be interfered with, as it is believed to be an effort of nature to throw off the poison.

As a mouth wash the following is excellent:

No. 308.	Chlorate of potash,	2 oz.
	Molasses,	8 oz.

Rub well together. A spoonful of this to be placed within the lips several times a day.

For the external ulcers on the foot, Mr. Gamgee recommends:

No. 309.	Powdered chalk,	4 ozs.
	" charcoal,	1 oz.
	" alum,	
	Sulphate of zinc, of each,	½ oz.

Mix for a powder to be sprinkled on the ulcers.

The following wash is used for both foot and mouth ulcers:

No. 310.	Sulphate of copper,	1 lb.
	Soft water,	1 gallon.

Wash the mouth with this, by means of a sponge fastened to a stick and bathe the feet with it, especially between the claws.

CHARBON—BLACK QUARTER—QUARTER ILL—CONTAGIOUS ANTHRAX—BLOODY MURRAIN.

Definition.—A contagious and malignant disease of the blood, most common in cattle, but communicable to all domestic animals, and even to man (when it is known as "malignant pustule.") It is called by the French *charbon*, a coal, and by the English "black quarter," "black leg," "black tongue," etc., because the part attacked turns of a dark purple or nearly black color, from the decomposition of the blood.

Causes.—The French writers, who have given this disease especial study, on account of its prevalence in their country, teach that it arises from contagion; from spoiled and tainted food; from pasturing in low swamps and among stagnant pools; and from hot and damp seasons. It is most commonly seen in summer and autumn, especially when the temperature is high and rain frequent.

Most of the latest writers believe that the contagious principle of charbon or anthrax consists in certain extremely minute vegetable organisms which are found in the blood in vast quantities. They are in the shape of rods, and have been called *anthrax bacteria* and *bacillus anthracis*. They are so extremely small that one writer estimates that eight or ten millions may exist in a single drop of diseased blood. Carefully conducted experiments leave hardly any doubt but that these are capable of conveying this disease to healthy animals.

These poison-producing organisms have a wonderful tenacity of life, and hence every part of a diseased animal, the blood, flesh, hides, hair, hoof, horns and excrement are poisonous, and will convey the infection. Prof. Gross mentions the history of three persons who were attacked by the disease after picking the feathers from a turkey-buzzard (a bird itself

not liable to anthrax), which had fed on the carcass of an ox dead of murrain. Flies can carry the disease on their feet and proboscees. An ox yoke worn by an infected animal has been known to carry the infection to a well one; and even grain and straw, grown on a soil where a diseased animal has been buried, are said on good authority to communicate the malady. Strong alcohol does not diminish its virulence. Prof. Agnew tells of his own knowledge a case where a man died of malignant pustule; his face had been occasionally wiped with a handkerchief saturated with alcohol; *six months* afterwards his widow used a little alcohol from the same bottle to bathe her face, and was at once attacked with the same terrible disease.

Symptoms.—The animal becomes languid, the ears drop, the eyes are red, the mouth and nose hot and dry, and the pulse rapid and feeble, from 80 to 120 beats per minute.

In the course of a short time swellings appear about the loins, back, head, neck, brisket or legs. They cause pain and stiffness, which make the animal unwilling to move or rise up if he is lying down. The appetite is entirely lost, he does not chew the cud, the bowels are constipated, and the urine scanty and dark in color.

When the swellings mentioned are felt, they are found to be cool or cold, not very tender or painful, and may give out a crackling sound. They are dark or nearly black in color, having the appearance of mortification.

In a few hours or a few days the symptoms of exhaustion deepen greatly; the animal cannot rise from the ground, his eye is fixed and staring, the breathing is shallow, and he dies often in convulsions.

When the disease attacks the tongue it is known as "black tongue" or "blain;" and when in the throat, as "malignant sore throat" or "putrid sore throat." At times the tumors form on the intestines, when the prominent sign is the pas-

sage from the bowels of quantities of dark colored blood, which form is particularly known as "bloody murrain." Or it may attack the spleen, causing a rapid and fatal malady, sometimes described as "apoplexy of the spleen." This is especially common in milk cows.

When charbon is prevalent, almost any wound which one of the herd receives, no matter how free he is from the disease, is very liable to put on this malignant form of ulceration, and lead to fatal results.

Gloss-anthrax or blain is occasionally, perhaps often, epidemic among herds. On examining the mouth, the tongue seems enlarged, and large vesicles or blisters, dark red or purple, are seen running along its sides and under surface, especially toward the tip. These vesicles are filled with a bloody fluid, which flows forth when they break, leaving an angry raw spot, which quickly becomes a corroding ulcer. Other blisters form near it, and in malignant cases, the blood of the animal is quickly poisoned, and death may ensue in twenty-four hours. In less rapid cases, the tongue is gradually eaten away by the ulcerations, the glands behind and under the jaw swell and break externally, and other ulcers begin to appear about the feet, particularly at the junction of the haw and the hoof, threatening the loss of the hoof.

Constipation is always present, and an irritative fever of a low typhoid form speedily makes its appearance, and carries off the animal.

This fever led to the disease, in some of its forms, being described as "inflammatory fever of cattle," by Youatt and others; but a more modern study of its nature has shown that the fever is a symptom only of a general blood poisoning.

"Anthrax fever" occurs when the malignant inflammation attacks some of the internal organs. The cow or steer ceases feeding and ruminating, trembles, has partial sweats,

arches the back and rests his quarters against a wall or fence. The temperature is high, 105° to 107°; and this is the earliest symptom of the approach of the disease. The eye is sunken, dull and often yellow; the pulse weak and irregular, the breathing jerky, and there is tenderness over the loins, back or sides. The urine becomes bloody, a bloody liquid escapes from the nose, the eyes and the anus, and the dung is mixed with blood. Hence the expressive name of the disease, "The Bloody Murrain." The temperature falls below the natural one (100°), and the animal dies in convulsion or stupor, often within twenty-four or forty-eight hours of the first symptoms; or else, the symptoms rapidly disappearing, he makes a prompt recovery.

A remarkable form of the disease prevailed in Nebraska in 1872–3. It was confined to cows and heifers. They were attacked, while apparently in perfect health, with a malignant carbuncle or gangrenous swelling at the lower commissure of the vagina, the spot looking "as if dead or frozen." This ulcerated and extended rapidly up the vagina, involving the rectum and surrounding tissues. In about twenty-four hours from its first appearance, the cow was seized with nervous shudders, violent twitching of the tail and loss of power in the hind quarters. By the wild eye, total loss of appetite and bellowing, it was easy to see the suffering was great. In from thirty-six to forty-eight hours from the beginning of the attack it usually proved fatal. Inflammation and ulceration of the lower bowel and vagina were the principal *post mortem* appearances. It was asserted that the early application of crude petroleum to and in the vagina cured some cases. The facts were reported by Senator Dodge to the United States Commissioner of Agriculture, but the nature of the disease was not recognized at the time.

Treatment.—In spite of the extensive studies that have been given to this destructive disease, no very successful

method of treatment has been discovered. It may be premised that all bleeding, purging, lowering medicines are hurtful; and that all local applications to "backen" the swellings are useless.

Prof. Williams believes the most promising treatment is:

No. 311.	Chlorate of potash,	½ oz.
	Water,	1 pint.

Mix and give three times a day.

This, he says, is superior to all other medicine.

In blain, and whenever the disease arises from inoculation, (as in "malignant pustule" in man), the great majority of cases can be cured if seen at an early period, before the poison of the local pustule or vesicle has been absorbed into the system. The treatment must, however, be prompt. The vesicle or pustule must be freely opened with a lancet or sharp knife, from end to end, and the raw surface thus exposed thoroughly mopped with a chloride of zinc solution (twenty grains to the ounce of water), with tincture of the chloride of iron, with sulphuric or nitric acid, nitrate of mercury or of silver, or some other efficient caustic. The hot iron itself is the best in some locations.

In bloody murrain Youatt and others have spoken highly of chloride of lime (bleaching powder):—

No. 312.	Chloride of lime,	2 to 4 drachms.
	Prepared chalk,	1 oz.
	Laudanum,	2 drachms.

Mix and give in a pint of warm gruel every two or three hours.

A similar remedy has been praised by Sir J. Tyrrell, to-wit:—

No. 313.	Sulphite of soda,	1 oz.
	Water,	3 gallons.

Of this the sick animal is to be given to drink as much as it wants.

Mr. Dun combines the soda with chlorate of potash, as:—

No. 314.	Sulphite of soda,	
	Chlorate of potash, of each	1 oz.

Give in a quart or two of water two or three times a day.

Of undoubted and positive efficacy both in the prevention and treatment of this disease is a *seton in the dewlap,* and it should always be inserted at the first intimation of the malady, smeared with irritating ointment and turned every day. It should be a broad, coarse tape, a foot long and an inch wide, and it should remain in six or eight weeks.

All animals who die of any form of this disease should be buried at once, as their flesh is poisonous to man and beast, and the odor from their decaying bodies is believed to disseminate the disease.

Recent French authors recommend as specifics large doses of *quinine,* one to two drachms repeated every two or three hours in severe cases; and the hypodermic injection of a solution of *iodine* in the following solution:

No. 315.	Iodine,	2 grains.
	Iodide of potassium,	5 grains.
	Water,	1 oz.

Use a syringeful every hour in severe cases.

In extreme cases this may be thrown into the veins. It is of absolute importance that with this treatment the strength be kept up with frequent doses of stimulants, among which these writers recommend most strongly the *carbonate of ammonia.*

The germs of the disease, when it is epidemic among animals, may be destroyed by fumigation with sulphur (as recommended, page 28), and by sprinkling the forage or pastures with solutions of sulphuric acid, one drachms to two gallons of water.

TEXAS CATTLE DISEASE—SPANISH FEVER—SPLENIC FEVER.

Definition.—A contagious fever originating in the low swampy lands of Southern Texas, and extended by the exportation of cattle to other sections. In its effects on the system it very closely resembles the Rinderpest of Asiatic Rus-

sia, but it is less destructive and less contagious. Animals are found after death to have the spleen enlarged and softened, the fat is yellow, the blood fluid, and the kidneys broken down.

Causes.—The Texan cattle themselves do not appear to suffer from this disease in a violent form; but it proves very fatal when introduced into Northern herds. Its contagion is communicated through the dung, and the roads, pastures and streams convey it into other neighborhoods. It is destroyed at once by frost, and, apparently, one Northern animal cannot give it to another.

Symptoms.—Four or five weeks may pass after the poison has been taken into the system before it shows itself. There will be at first a moderate fever, showing an increase of temperature to 103° to 107°.

This is followed in five or six days by dullness, drooping of the head, arched back, cough, trembling, jerking of the muscles, the horn hot, and the appetite and cud lost.

The eyes become glassy and watery, the urine turns to a deep red or black from the blood which is in it, and the dung is hard and often coated with blood. When the mouth and rectum are examined, they are found to be of a dark red or coppery color. The animal dies in a stupor or in convulsions.

In 1871 the United States Government published an elaborate study of this disease, prepared by Prof. John Gamgee and other eminent observers. They found it to occur in two forms. The first is insidious, latent and usually fatal, and the more frequent form among Southern cattle; while the more active form is found in Northern herds.

After death there is only one diseased condition of the organs which is invariably present. The fourth stomach, however, is "almost invariably" distinctly inflamed, and the

spleen is uniformly enlarged, the weight varying from two to ten pounds. It is of a purplish color, and on cutting it the pulp oozes out, it being soft, like currant jelly. From this condition of the spleen, which was found in nearly 5,000 cases, Prof. Gamgee calls the disease "the splenic fever."

While not stating positively an opinion on its cause, he does assert that all the cattle in the States bordering on the Gulf of Mexico, for a distance of two or three hundred miles inland, are affected with malaria; that they have "ague cake" and thin blood, and more or less disturbance of the stomach; and it is this low tone of the system which he conjectures, leads to an imperfect development of the blood, and the generation of a "crowd poison," highly injurious to other members of the same species not under the influence of the same conditions. He does not consider it a true epizootic or contagious disorder, but one conveyed by the excretions of the animals (the dung, urine, etc.,) containing poisonous matters.

Treatment.—The animal should be put in a roomy stall where the ventilation is good, and should have soft food. Internally he should be given twice or three times a day:—

No. 316.	Chlorate of potash,	½ oz.
	Tincture of chloride of iron,	1 oz.
	Water,	1 quart.

Mix, and give at one dose.

When the weakness becomes considerable he should have whisky freely.

As soon as the most dangerous symptoms are passed the food should be light and plentiful, and tonics be administered, as:—

No. 317.	Sulphate of iron.	½ oz.
	Tincture of ginger,	1 oz.
	Water,	1 qt.

This amount twice daily.

A remedy relied on by many, as the best in this disease, is:—

No. 318.	Bicarbonate of soda,		
	Carbolic acid,	of each,	12 ozs.
	Glycerine,		4 ozs.

Of this the dose is two tablespoonfuls, three times a day, in a quart of water.

Prof. Gamgee in his report above referred to does not speak hopefully of any particular plan of treatment. He recommends the animals should be sheltered, the limbs well rubbed, and the bowels moved by injections. Relief is afforded by ounce doses of laudanum during the first day or two. He adds that he has seen cows return to nearly their full quantity of milk on such treatment, aided by the following stimulant:

No. 319.	Sulphuric ether,	½ oz.
	Solution of acetate of ammonia,	4 ozs.

Give in a quart of linseed tea or water, three times a day.

COW-POX—VARIOLA VACCINA.

Definition.—A contagious fever, characterized by an eruption which is at first a pimple, then a vesicle, next a pustule, and last a scab. It is the same disease as small-pox in man.

Cause.—The only cause positively known is inoculation or contagion. But there seems little doubt but that in certain instances cow-pox has appeared "spontaneously" in a dairy. At times it seems to spread rapidly through several herds, but is generally neither very contagious nor is at all dangerous, fatal cases being very rare.

Symptoms.—There is more or less of fever for a few days preceding the attack. The pimples appear on the teats, udder and belly; the milk is diminished, and the appetite slightly impaired. Successive crops of vesicles are formed, burst, and dry up, appearing thus one after another for several weeks.

Treatment.—This need not be active. When the disease first appears, it is well to separate those affected with it from the rest of the herd, to prevent the contagion spreading.

CHAPTER II.

NON-CONTAGIOUS AND LOCAL DISEASES OF CATTLE.

Catarrh—Colds—Coughs—Snores—Snivels.
Consumption—Wasting—Pining.
Hollow Horn—Horn-ail—Anæmia of Cattle.
Hoven—Blown—Impaction of the Rumen or First Stomach.
Fardel-bound—Maw-bound—Stomach Staggers—Impaction of the Omasum or Third Stomach—Gastritis of Ruminants—Lakeburn.
Obstruction of the Bowels.
Congestion and Inflammation of the Liver—The Yellows.
Red Water—Black Water—Bloody Urine.
Dysentery—Bloody Flux—Scouring Rot.
Milk Sickness—The Trembles.
Rheumatism—Felon.
Foul in the Foot—Foul-claw.
Lice, Ticks and other vermin.

CATARRH—COLDS—SNORES—SNIVELS.

These disturbances of the breathing tubes are in causes, symptoms and treatment essentially the same in cattle as in horses. (See pages 102, 105).

Cattle are, however, peculiarly subject in some localities to a stoppage of the nostrils by an abundant, thick secretion, and by the swelling of the lining membrane. This forces them to breathe with some difficulty; they emit a snorting or snoring sound, from which the disease is locally termed the "snores" or the "snivels."

On examination, there is occasionally found a swelling inside the nostril, which nearly fills the passage, and later bursts and forms an abscess. When this breaks the animal is relieved.

This form of nasal catarrh is asserted to be confined to horned cattle.

The treatment is to inject the nostrils with olive oil, so as to prevent the drying of the secretion; to have the animal inhale steam from hot bran mash in a nose bag; and to syringe the nostril with a disinfectant solution when the abscess breaks.

A cough in a cow should not be neglected, as these animals are peculiarly prone to have it run on into consumption. The throat and breast should be well rubbed with mustard stirred up in boiling water, and if there is fever, the following modification of Mr. Youatt's "fever powder" will be in place:—

No. 320.	Powdered digitalis,	½ drachm.
	" ipecac,	1 drachm.
	Nitrate of potash,	
	Sulphur, each,	2 drachms.

To be given in a pint of gruel, linseed tea or slippery elm bark mucilage, as occasion requires.

When there are no feverish symptoms present, but only an old hacking, or hoarse cough, the following is praised by Mr. Gamgee, as a useful expectorant in all animals:

No. 321.	Guaiacum,	2 ozs.
	Sassafras root,	1 oz.
	Water,	1 qt.

Boil to a pint, and add a half ounce of liquorice stick. When dissolved, strain, and give in two doses, night and morning.

Young cattle and calves are particularly liable to a cough from the presence of a species of worm in the throat. Whenever they are noticed to have a hoarse husky cough this may be suspected. The proper treatment will be considered under Hoose.

The bowels should be kept moderately loose in all chronic coughs, the animal sustained on tonics and good and abundant food, protected both from inclement weather and

from too hot stabling; and it is good practice to insert a seton, and thus establish counter-irritation from the lungs.

CONSUMPTION—WASTING—PINING.

Definition.—A tuberculous disease, allied to phthisis in the human race; in cattle, rarely found attacking solely the lungs, but rather the intestines, mesentery and serous membranes, and other tissues.

Causes.—Consumption in cattle, as in the human race, is very often hereditary, and often follows severe and neglected colds, insufficient food, exposure to cold and wet, excessive milking, and as a sequel to various acute diseases.

Symptoms.—These differ in respect to the parts of the system which the disease attacks.

When its seat is the intestines, it produces tubercular chronic dysentery. There is a constant scouring, with the discharges bloody, very foul smelling, and mixed with pus. This, and the wasting of the flesh and fever, strongly resemble ordinary chronic dysentery; and, indeed, it is generally considered during life to be this latter disease.

In general consumption, the early signs are unthriftiness, irregular appetite, a dry cough, a dull skin and dirty hair. If it is a cow, she will probably abort, the milk will become thin and watery, and if not pregnant she will probably have violent and continued sexual desire.

With these signs there is steady loss of flesh; the cough increases but there is no discharge from the nose or mouth; the digestive organs are weak, and watery diarrhea may set in, which soon reduces the animal to a skeleton and destroys life.

By listening to the lungs, some differences from the natural sound are nearly always heard, but these are neither constant

nor well marked. There may be dullness from water on the lungs, and also dropsy of the belly.

The disease is very variable in its duration, sometimes running its course in a week or two, sometimes extending over several months.

In cases where the serous membranes are most exposed to the tuberculous change, the joints are not unfrequently attacked, producing marked and incurable lameness. Ignorant farriers often treat these cases with firing, setons and blisters, and thus add still further to the misery of the beast.

Treatment.—To have any chance of success, the treatment must be begun in the earliest stage of the disease. Cows should not be milked nor oxen worked, fattening food should be given, careful attention paid to their housing and healthy surroundings, and the digestive organs well looked after.

The most appropriate food is milk, oil cake, sound hay and ground corn. Internally, cod liver oil should be given in doses from a quarter to a half pint daily. A seton should be inserted and turned daily, to counteract the process of disorganization.

Change of climate does not seem to be of any benefit in the consumption of cattle. On the contrary, the disease is often produced by such a change, although from a low and swampy to a dry and well drained locality.

As the hereditary character of the disease is universally recognized, it is not desirable to raise calves of consumptive mothers. They should be slaughtered, and others obtained for keeping.

HOLLOW HORN—HORN-AIL—ANÆMIA OF CATTLE.

Definition.—A special diseased condition of the blood, in which there is either a deficiency in the amount of blood in the body, or a diminution of some of its important constituents, especially the red blood corpuscles.

Causes.—Such a condition of the blood may follow an attack of any acute disease where the recovery is slow and partial; but generally it is brought about by poor or insufficient food, exposure and neglect, foul air, lack of cleanliness and other necessary conditions of health. The food may be abundant in quantity, but contain an excess of water and a deficiency of solid matter. Thus, instances are given in the *Country Gentleman's Magazine*, 1874, where the exclusive use of roots, or of green food growing on damp soil, and even the persistent use of one food only, resulted in this depraved condition of the blood. Cattle fed winter and summer on timothy hay have been known to suffer from it. Monotony of diet in them, as in human beings, leads to the manufacture by the digestive organs of an inferior quality of blood.

Symptoms.—These are those of general debility and "poor condition." The animal is scant of flesh, hide bound, and with staring coat. The hair is often ragged and lousy. The appetite is ravenous or irregular; the bowels either constipated or too loose, generally the latter, the dung is foul-smelling, and there is much wind passed. The pulse is feeble, and the animal easily fatigued. On examining the inside of the mouth, the lining membrane looks paler than usual, and on feeling the horn it is colder than natural, sometimes almost "deathly cold."

This last mentioned trait is what has given the disease its common name, and the ordinary cowleech imagines the disease is a local one, originating in the horn. Hence he will bore it with a gimlet and squirt some turpentine into the

orifice; or he will put a plaster at the base of the horn. But in fact, the temperature of the horn is low on account of the general poverty of the blood, and these measures are vain.

Though we have been familiar with cases of this disease from boyhood, we have never seen one where the horn actually was hollow; though that this might not happen through the processes known as atrophy and absorption of the inner vascular structure, we do not deny. Later symptoms of the disease are swellings under the jaws and about the navel, and dropsy of the belly.

Treatment.—This is suggested by what has been said of the causes of the disease. The animal must be well fed, well housed and well cleaned. The food should be given in small quantities and often. If lousy, as is very often the case, it must be washed and some of the insecticides recommended for that purpose must be applied.

No boring or bleeding is needed. It will not be amiss to commence with a moderate dose of salts or oil, to clean out the bowels. The diarrhea, if persistent, should be checked by astringents. After this, a tonic is needed, especially an iron one, in small doses, to aid in enriching the blood; and with it may be very advantageously combined a little nux vomica, to stimulate the nervous system, as:

No. 322.	Sulphate of iron,	2 drachms.
	Powdered nux vomica,	1 drachm.
	Powdered gentian,	1 ounce.

This amount daily in dry food or as a drench.

After one week it should be suspended for a week, and then resumed for one week more. These measures will certainly cure all cases of hollow horn that do not depend on some serious organic disease.

HOVEN—BLOWN—IMPACTION OF THE RUMEN.

Definition.—A form of indigestion in cattle, frequently accompanying other diseases, consisting of an unnatural distension of the rumen or first stomach by food, and by the gases it gives off in the process of fermentation, or by gases evolved from the walls of the organ.

Causes.—In health this condition is brought on by over feeding with damp grasses, especially green clover. Almost any food in excessive quantities may produce it. In various diseases there is a secretion of gas from the inner coat of the stomach, causing great and painful distension, sometimes called "tympanites."

Symptoms.—There is a swelling on the left side, which appears while the animal is feeding or shortly afterwards. The breathing is difficult and painful, becoming more so as the gas is generated and the swelling increases. This is manifested by the general appearance of the animal. There are expansion of the nostrils, moaning during expiration, belching, dribbling from the mouth and uneasiness. The animal loses his cud. The bowels are constipated; and if the swelling is great, there will be a prominence and wildness of the eye, which is characteristic of obstruction to the entrance of air into the lungs.

Unless relieved, the animal will die from suffocation, from laceration of the stomach, or from blood poisoning from the gases.

Treatment.—In very severe cases, when the swelling is from gases, the proper course is to plunge a trochar into the rumen and allow the gas to escape through the canula. The operation is to be performed on the most prominent part of the swelling, and if the tube becomes choked by the contents of the stomach, it must be cleaned out with a wire or stick.

When the symptoms are not so urgent as to call for this

measure, they can generally be relieved by some of the stimulants given below. After the severe symptoms are relieved, a strong purgative is to be prescribed, such as:—

No. 323.	Epsom salts,	½ lb.
	Croton oil,	20 drops.
	Linseed oil,	1 pint.

Mix.

In cases where the swelling is from over feeding, and the rumen is crammed with solid matters—which is easily recognized by its doughy feel and solid sound on percussion—it is often necessary to empty it before any medicines can take effect. The best method of performing this operation is as follows:

Fasten the animal by its nose, with its right side to the wall; then plunge a sharp bistoury into the rumen, beginning midway between the last rib and the spine of the haunch bone, and from four to six inches from the back bone, cutting downward until the opening is large enough to admit the hand. Then run a stitch through from the skin to the inner part of the stomach at the lower portion of the cut, so that the contents of the stomach may not escape into the cavity of the abdomen. Turn out with the hand these contents. Clean the edges of the wound thoroughly. Sew up first the coats of the stomach, turning the edges in; and next the outer wound in the usual manner. Apply a stiff pitch plaster over the wound, and feed the animal on small quantities of slops for a few days.

Of medicines, Mr. Dun recommends turpentine, in small and repeated doses, as half an ounce every fifteen minutes, until four ounces are taken. Mr. Gamgee prefers assafœtida:—

No. 324.	Assafœtida,	½ oz.
	Linseed oil,	1 pt.

Mix for a drench.

Or :—

No. 325.	Strong solution of ammonia,	½ oz.
	Water,	1 pt.

For a drench.

Or :—

No. 326.	Creasote,	2 drachms.
	Water,	1 pt.

For a drench.

Other stimulants used are whiskey and brandy, oil of peppermint, essence of ginger, and red pepper tea, either of which will at times work satisfactorily, and at others fail entirely.

When the animal is liable to frequent returns of the disease, Prof. Law recommends careful dieting, and the following tonic :

No. 327.	Fenugreek,	
	Iron rust,	
	Carbonate of soda,	
	Common salt, of each,	4 ozs.
	Powdered nux vomica,	2 drachms.

Mix well, and give a heaping tablespoonful, twice daily, in the food.

FARDEL-BOUND—MAWBOUND—STOMACH STAGGERS—IMPACTION OF THE THIRD STOMACH—GASTRITIS OF RUMINANTS—LAKEBURN.

Definition.—Distension of the third stomach, the manyplies or omasum, with undigested food, which may be followed by congestion and inflammation of its lining membrane, and also of that of the fourth or true stomach, the caul or abomasum.

The best authorities on veterinary medicine, such as the late Professor Dick and Professor Williams, do not make a distinction in practice between impaction and inflammation of the third stomach. By the older writers impaction was called "fardel-bound," and inflammation, "lake-burn ;" and they taught that the third stomach alone was the one usually at fault. Closer observation has shown that the symptoms

of these supposed diseases really refer principally to inflammation of the fourth or true stomach. The third compartment, indeed, participates in the disorder; as do also often the first and second stomachs; but the main and principal seat of the morbid change is in the abomasum; thus showing the disease to be a true gastritis, or inflammation of the stomach.

Causes.—The causes of the disease are sudden changes in the food, or in its condition. Sometimes the consumption of damp or mouldy hay will produce it. More frequently it appears when the animals eat ravenously of spring grass, clover or green corn. So also an excess of corn meal, cotton cake, or similar dry and heating food; or irritating substances, as wild mustard, or various poisonous articles are liable to bring it on.

Symptoms.—A highly excited state of the nervous system is a distinguishing symptom. It is shown by a glaring eye, madness, staggers or fits, or by stupidity and palsy of the hind quarters.

The bowels are at first loose, but this is soon followed by an obstinate constipation. The animal often strains violently, and passes both blood and watery substances; and a hard swelling may sometimes be detected on the right side, owing to impaction of the stomach. In many cases swelling of the whole bowels and stomachs comes on early in the disease, causing severe colicky pains, and greatly adding to the animal's suffering.

After death, the contents of the third stomach are generally found hard and dry, the coats of the fourth stomach red and inflamed, or pale and soft, and the bowels filled with gas and watery, half digested food. The fluid condition of the contents of the intestines shows that the obstinate constipation is due to palsy of the bowels.

Treatment.—The old treatment of this disease was bleeding largely until the animal was faint; giving it a full sized dose of purgative medicine, and pouring cold water from a height upon its head.

Very few surgeons would follow this plan now. Recognizing that the disease is an inflammation of the coats of the stomach and bowels, to give strong purges is to rasp and irritate still more the inflamed membrane, and to lessen the chances for life which the beast has left him; and to bleed in a disease where death often comes through exhaustion, is contrary to all prudent doctrine.

Therefore it is best to begin with a sedative and an alkali, as :—

No. 328.	Extract of belladonna,	2 drachms.
	Bicarbonate of soda,	1 oz.

Mix in a quart of water and give three or four times a day.

Or—

No. 329.	Tincture of aconite root,	20 drops.
	Lime water,	
	Sweet oil, each	4 oz.

Add to a quart of milk and give three times a day.

Give the animal plenty of milk and water to drink, and as soon as the severest symptoms are abated, horn down a quart of linseed oil, repeating it every twenty-four hours till it brings on a moderately free evacuation of the bowels.

Professor Strangeway's treatment, which was very successful, was as follows: He gave, to begin with, such a dose as this :—

No. 330.	Laudanum,	2 oz.
	Castor oil,	1½ pints.

To be given at one dose.

When the feverish symptoms had to some degree abated, he prescribed :—

No. 331.	Sulphate of magnesia,	10 oz.
	Sulphuric acid,	20 drops.
	Quinine,	30 grains.

Mix with a quart of water for one dose.

After this he kept the animal quiet, and did not disturb its bowels with any medicine for three or four days, when, if the constipation continued, the last prescription was repeated. He found it very seldom necessary to do this.

A peculiar form of impaction of the third stomach is of frequent occurrence in the corn producing districts of the United States, where at times it has severely devastated the herds. This disorder formed the subject of a special report to the Department of Agriculture by Prof. Gamgee, published in 1871. He found that it was owing to the cattle eating quantities of smutty or ergoted corn, and the disease is consequently most frequent after wet seasons.

The cattle are constipated. The animal lies down, has an unthrifty coat, dry muzzle, dull eye, trembles easily, perhaps shivers, or seems delirious. One of two conditions predominate; one of stupor, staggering and sluggishness; or else of excitement, wildness and apparent blindness. The animal dies speedily, in from one to four days. At death the third stomach is always found firm, distended, and the food caked between the folds, while the fourth stomach contains but a scant quantity of greenish, half digested matter.

Almost all animals die unless relieved; but fortunately it is not difficult to treat them so successfully that the danger can be averted. At first a purgative must be administered. The one Prof. Gamgee recommends is:—

No. 332.	Sulphate of magnesia,	1 lb.
	Powdered aloes,	4 drachms.
	Powdered ginger,	2 drachms.
	Water,	1 quart.

Give in warm linseed tea, oat meal gruel or water.

Warm water injections are of the highest importance, and they can be given in such cases most advantageously by the funnel described on page 43. About a quart or two of lukewarm water, without any addition but a little sweet

oil to lubricate the instrument, should be poured into the rectum every half hour.

On the second day it may be found that the medicine does not act very freely. The best agent to be given then is:—

No. 333.	Carbonate of ammonia,	½ drachm,
	Linseed tea.	1 quart.

Mix for a drench twice or thrice a day.

As soon as the appetite returns, a succulent diet, such as grass, sweet hay, boiled turnips, etc., will complete the cure.

OBSTRUCTION OF THE BOWELS.

Definition.—A closure of the intestinal tube, either by twisting upon itself, when it is known as "gut tie" or "the cords;" or by being involved in the sac of an irreducible rupture; or other mechanical means.

Causes.—In the ox such a condition may arise from castration carelessly performed, as was pointed out by Professor Dick, of Edinburgh; or from dust balls or foreign substances becoming impacted in the bowels and setting up inflammation which binds the intestines in a cord; or from kicks and severe blows, leading to the same result. Though perhaps more common in the ox, it is not, as Mr. Youatt taught, at all confined to that animal.

Symptoms.—These are obstinate and absolute constipation, and excessive pain, coming on in paroxysms of atrocious severity. The belly swells, the ears and horns are cold, the eyes are indicative of intense suffering, the mouth and muzzle turn pale, and the breathing is laborious and heard at a distance. The disease continues for six or eight days, and death comes from exhaustion.

Treatment.—The result is usually fatal. Yet cases are on record where recovery took place, and the obstruction was overcome.

Purges of all kinds are utterly out of place. They are both useless and harmful. The only medicine to give by the mouth is the following:—

No. 334.	Laudanum,	2 oz.
	Extract of belladonna,	2 drachms.
	Essence of ginger,	1 drachm.

Rub down the extract in a pint of linseed tea, and give the whole every two or three hours.

No fears must be had of over dosing, as it is a hand to hand fight with death.

Large clysters of warm water should be given by the rectum, and repeated every two hours. In some instances the addition of a spoonful of tobacco tea to these clysters have brought about severe nausea, and with it a relaxation of the "tie," followed by prompt relief.

THE YELLOWS—CONGESTION AND INFLAMMATION OF THE LIVER.

This is by no means so common a disease among cattle as many farriers would have us believe. It is more frequent in the Southern than in the Northern States, in the late summer and fall than at other seasons, and in milk cows and stall fed steers than in other members of the herd.

Causes.—Over feeding with rich food, the use of heating condition powders, sudden changes of the weather from hot to cold, producing chills, excessive milking, gall stones, and old age.

Symptoms.—The animal "loses the cud," as the herdmen say; that is, he ceases to ruminate. He appears dull and languid, is hide bound, and has a rough, unhealthy coat. He is loath to move, loses appetite and is generally listless and sluggish. Sometimes he staggers and seems weak.

On examining the whites of the eyes and the interior of the mouth, it is found that they have a dull, muddy, yellowish cast. The bowels are generally costive or have a loose, ill-

smelling scouring. In cows, the secretion of milk is lessened; and in the pasture they wander off by themselves in a dejected manner.

Treatment.—This should begin by changing the animal's food and surroundings. If it is a stall-fed steer, he should be turned into the yard or field, given plain sweet hay or bran mashes, with plenty of water. If it is a milk cow on a rich pasture, she should be stabled in a roomy stall and fed on light slops, her coat well rubbed and curried, and milked only moderately.

For medicines, a moderate warm laxative is in order, as:—

No. 335.	Powdered aloes,	
	Powdered ginger, each,	½ oz.
	Castile soap (scraped fine),	
	Peruvian bark (powdered), each	1 oz

Mix in a pint of warm water for a drench.

This may be repeated once every three or four days.

Another excellent combination is to use small doses of turpentine and salts, as:—

No. 336.	Sulphate of magnesia,	
	Common salt, each	½ lb.
	Oil of turpentine,	1 to 2 oz.
	Slippery elm mucilage,	1 quart.

Give every day or every other day for a week or two.

The following also will be found efficient in slow cases. It is a modification of a formula of Prof. Law:—

No. 337.	Podophyllin,	20 grains.
	Powdered nux vomica,	1 drachm.
	Sulphate of magnesia,	
	Powdered gentian, each	1 oz.

Mix in a quart of gruel or linseed tea for a drench every day or two.

When jaundice is brought on by a gall stone, we have, in addition to the yellow skin as seen in the mouth, and the jaundiced eye, heaving of the flanks, a hard, rapid pulse, no appetite, but an insatiable thirst. The ears are alternately cold and hot, the urine changes to a transparent yellow, dark

red or brown, the bowels are constipated, and when the dung passes it is in hard and black masses. For this condition a full dose of salts is demanded, combined with opium to relieve the pain, as:—

No. 338.	Sulphate of magnesia,	1 lb.
	Croton oil,	20 drops.
	Laudanum,	2 oz.

Mix in a quart of linseed tea.

Mashes should be given to hasten and increase the action of the physic, and the animal should be turned out to grass during the day.

RED WATER—BLACK WATER—BLOODY URINE.

Definition.—A disease of cattle characterized by the passage of reddish, chocolate colored or black urine, the coloring matter being derived from the blood.

The exact nature of this disease is not yet clearly ascertained. The urine always contains albumen and broken-down corpuscles; but the kidneys indicate no inflammation, their color is lighter than natural, the tubules are enlarged, and sometimes their lower surfaces spotted with effused blood. It is probable, therefore, that the disease is a general degeneration of the system, showing itself by an early and obscure form of kidney disease, similar to some of the phases of Bright's disease in man.

Cause.—This is well ascertained to be scanty and unhealthy food. Indeed, it has been called in England "the disease of the poor man's cow." It is quite common in cows two or three weeks after calving, when they are fed on turnips grown on swamp lands. It is also frequent in bad weather, when food is scanty, and of inferior quality.

Symptoms.—The characteristic symptom is the color of the urine. With this are associated great prostration, palpita-

tion of the heart, a rapid and trembling pulse, and at first diarrhea, which is followed by obstinate constipation.

In the form which attacks cows after calving, there is, in addition to the above signs, loss of milk, and the vagina has a contracted or puckered-up appearance. The milk sometimes froths unusually in the pail, and on standing deposits a reddish sediment.

The black water is said by some writers to appear after the red, and to be a sign of the advance of the disease to a more serious stage. When the change takes place from red to black water, the animal often stales several times of a natural color.

Treatment.—As the complaint is essentially one of faulty or insufficient food, the most pressing rule is to put the animal at once on sound and abundant diet. It should be taken from a low lying or scanty pasturage, to one well drained and set in succulent grass; or if stall-fed, turnips should be discarded, and plenty of boiled meal, corn, bran and sound hay be supplied. Besides this, rich animal food is of great value, as half a dozen eggs beat up in half a gallon of milk several times a day.

The violent purgative medicines, and the strong astringents so much and so indiscreetly urged by old writers, should be avoided. The bowels do best with moderate doses of oil, as :—

No. 339.	Castor oil,	2 oz.
	Linseed oil,	1 pt.

Give at a dose, and repeat every two days for three or four times.

The diarrhea generally present at the outset of the disease should not be checked, as it is an effort of nature to relieve the overloaded circulation. And for the constipation which follows, the above oil mixture will be sufficient to relieve it.

Along with the above, a chlorate of potash and iron mixture is always of great benefit:—

No. 340.	Chlorate of potash,	½ oz.
	Tincture of chloride of iron,	½ oz.

Mix in a pint of thin gruel for a dose: to be repeated twice a day.

Mr. Gamgee speaks well of the following:—

No. 341.	Sulphuric acid,	1 drachm.
	Laudanum,	½ oz.
	Molasses,	4 oz.

Mix with a pint of water in warm gruel and give daily.

Turpentine is advocated by Mr. Dun, Mr. Downing and others, as:—

No. 342.	Oil of turpentine,	2 oz.
	Nitrate of potash,	3 oz.
	Iron rust,	1 oz.

Mix for two doses, night and morning, in gruel.

The sulphate of iron (copperas) may be substituted for the iron rust.

DYSENTERY—BLOODY FLUX—SCOURING ROT.

This disease has already been described as it occurs in the horse (page 143). But it is much more frequently seen in cattle, where it has received the name "scouring rot," when it appears in its chronic form.

Symptoms.—In cattle the acute form is attended with shivering, arching of the back, and tenderness about the loins. The animal grunts, yawns, grinds its teeth, and at short intervals discharges from its bowels a thin and ill-smelling dung, mixed with blood and pus. There is much straining of the lower bowel, and the anus looks sore and red. There is pain in the belly indicated by arching of the back, whisking of the tail, and swelling of the bowels. The thirst is excessive, the animal is dull and stupid and loses flesh rapidly.

In the chronic form the thinness is marked, the hide is rough, unhealthy and often mangey, the teeth are loose, and the dung bloody and fetid. The eyes sink in the head,

dropsical swellings appear about the lower jaw and legs, and the creature dies exhausted.

Treatment.—In either form a change of diet is absolutely necessary to a restoration to health. If stabled, put on dry food, and given a pint of linseed oil every day or every other day, most slight cases of the acute kind will rapidly recover. It may be well if the action of the bowels does not cease promptly, to give a mild astringent, as:—

No. 343.	Powdered alum, Powdered ginger, each,	 ½ oz.

Mix and give in a quart of milk once or twice a day till the discharge moderates.

Or,

No. 344.	Powdered galls, Ipecacuanha, each	 ½ oz.

Mix and give as above.

The chronic form is a very obstinate disease, and not unfrequently baffles every attempt to cure it. Here, too, close attention to diet stands in the first line of treatment. Some writers recommend that all vegetable food be withheld, and the animal fed on broths, thin soups, the blood of other animals and milk. The following is an excellent food in such cases:—

No. 345.	Fresh mutton suet, Fresh milk,	2 lbs. 6 quarts.

Mix with gentle heat over a slow fire and give while warm.

Another valuable form of diet is:

No. 346.	Cod liver oil, Fresh eggs,	2 to 4 oz. 4 to 5.

Mix thoroughly in a quart of fresh milk and give twice a day.

To support these articles of diet, we may choose a gentle and stimulating astringent, as:—

No. 347.	Calcined rhubarb in powder, Powdered chalk, Powdered opium,	1 oz. 2 oz. 2 drachms.

Mix as a ball or in the food. To be given every morning.

When the dysentery is of an epidemic character, Mr. Gamgee recommends that the early feverish symptoms be subdued with twenty or thirty drops of the tincture of aconite root, given twice daily; and this followed, when the acute symptoms subside, with one of the following:—

No. 348.	Chloride of lime,	
	Tincture of arnica, each	2 drachms.
	Nitric ether,	1 oz.

To be given two or three times a day in gruel.

Or,

No. 349.	Solution of potash,	
	Wine of ipecac, of each	1 oz.
	Tincture of cantharides,	½ oz.

To be given in a quart of warm gruel daily.

When the discharges are slimy, bloody and weakening, sometimes, rapid improvement is derived from the following:—

No. 350.	Corrosive sublimate.	8 grains.
	Water,	1 pint.

Give one to two tablespoonfuls of this in a quart of water every two hours. The dose must, on no account, be greater than this.

This is well spoken of by Mr. Finlay Dun and others.

MILK SICKNESS—THE TREMBLES.

Definition.—A disease of unknown origin, affecting the blood and nervous system, strictly confined to certain localities in the Western and Southern States.

Cause.—This very strange disease has completely puzzled all observers to account for its appearance. It is developed in cattle by pasturing in certain definite localities, a particular meadow, mountain side or bottom. Many have attributed it to eating some poisonous plants, especially the white snake root, *Eupatorium ageratoides*. But the flora of the localities in question has been repeatedly scrutinized by competent botanists, and no plant whatever of a poisonous

character discovered, (and it appears where the snake root is unknown, and is unknown where that plant is common), have assigned it to drinking water, and others again to an "emanation from the soil." But all these are guesses only. It is common in some parts of Ohio, Indiana, Southern Illinois, Tennessee and South Carolina.

One of its most serious features is that it is communicable to man through the milk of diseased animals; and it is in many instances incurable, and finally fatal.

So concentrated is the poison that hides of animals which have died of it, if eaten by rats and mice, will destroy them as certainly as "ratsbane," as has been proven on unquestionable authority. Horses and sheep are also liable to attacks of it.

Symptoms.—The principal symptoms of the trembles are great weakness and prostration of the nervous system, dullness and drooping, accompanied by obstinate constipation and colic. The animals are unable to make any but the shortest journeys, and on the least fatigue stagger and tremble, or drop down.

Should they recover, or apparently so, and resume their usual condition of health, this nervous exhaustion remains, and they are never able to bear a long march. Animals which die of the disease usually present an acute inflammation of the intestinal canal.

Treatment.—This is either by large doses of stimulants or by full quantities of salts and other purgatives, aided by injections to overcome the constipation; or by both these methods combined, as occasion demands.

The pasturage should be changed and the suspected field ploughed up and cropped; or if it is a grove, it should be cut down, stubbed and tilled. Whatever the cause of the

disease may be, it has been conclusively shown that it disappears by cultivation of the infected district.

As the milk of poor and underfed animals is always much more dangerous than that of well fed ones, a full diet and tonics are clearly demanded in all cases where the trembles have showed themselves.

RHEUMATISM—FELON.

This disease has already been spoken of as it affects the horse, and the symptoms and treatment in cattle are substantially the same. (See page 178).

The advantages of blisters are conspicuous, and their use should not be neglected. Nitrate of potash (saltpeter) should be given to the ox in larger doses than to the horse, say two ounces twice a day; and a purge, half a pound to a pound of sulphate of magnesia (epsom salts) is preferable to aloes.

Cows, when suffering from rheumatism, will often lie down and refuse to rise. In such cases repeated change of bedding is absolutely necessary. The animal must be kept dry, clean and warm. The inflamed joints should be wrapped in dry flannel, and protected from injury.

Rheumatism in cattle is more apt than in any other animal to pass into suppuration and sloughing of the joint, causing what is sometimes called "bustian foul." This condition is incurable, and when it occurs the animal should be slaughtered at once, to put it out of its misery.

Treatment.—Of several plans of treatment specially adapted to cattle we may mention that by sulphur. This drug has an old and probably just reputation for chronic cases.

No. 351.	Flour of sulphur,	8 oz.
	Ginger,	½ oz.

Give in gruel every third day.

Small doses of turpentine combined with an alkali have also received praise in responsible quarters, as:—

No. 352. Oil of turpentine, 1 oz.
Bicarbonate of soda, 1 to 2 oz.
This amount in gruel every day or two.

Another frequently valuable mixture for old cases is:—

No. 353. Powdered guaiacum,
Caraway seeds,
Aniseed, of each 2 or 3 drachms.
Give in a quart of a decoction of willow bark every day.

The willow bark contains *salicin*, a drug of much value in rheumatic complaints.

Of embrocations to relieve the affected joints, those containing turpentine are among the best, as:—

No. 354. Neat'sfoot oil, 4 oz.
Oil of origanum,
Oil of turpentine,
Laudanum, of each 1 oz.
Mix and apply by gentle and thorough friction.

No. 355. Olive oil, 2 oz.
Oil of turpentine,
Strong solution of ammonia, each 1 oz.
Mix. This is a strongly exciting liniment.

These are very suitable in the "lumbago," or pain in the loins, which cows and oxen of rheumatic constitution are apt to be troubled with. In such cases, besides friction with the above, it is well to keep the lower bowel free with warm injections of water or soap and water, and to cover the hind quarters of the animal with rubber cloth.

This variety of rheumatism is sometimes known as "felon," when in its acuter form. The beast is then more or less off his food. His coat is staring, his eye dull, his nose is dry and his back or loins are sore, so that he flinches when the hand is pressed along the sides of the backbone, and arches his back. Often with this his teeth loosen. In such cases, if he is well housed and given the following cordial, he will generally soon recover:—

No. 353. Turmeric,
Fenugreek,
Powdered aniseed,
Powdered liquorice, of each 1 oz.
Mix, and give in a quart of ale daily for a few days.

A respectable English writer, Mr. M. M. Milburn, in his work on *Dairy Husbandry*, recommends a singular operation for this complaint, which he says he has tried in hundreds of cases with entire success. It is to cut the under side of the tail. This relieves the back and fastens the teeth. The operation is thus performed: Feel for a soft place on the under side of the tail. The knobs felt are the joints; between them lies the bone. Cut the skin across at the soft part; it will bleed for eight or ten minutes. When the bleeding has ceased, tie up the tail with a piece of linen cloth. As the operation is simple and safe, and may act in some efficient curative manner, it is worth remembering.

FOUL IN THE FOOT—FOUL CLAW.

Definition.—A disease of cattle characterized by inflammation and suppuration of the substance between the cleft of the hoof, and occasionally extending to the bones and joints of the foot, producing great lameness, with much fever, loss of condition, and even death. It is most commonly, but not invariably, seen in the hind feet.

Causes.—These are: Overgrowth of the hoof, causing an excessive strain on its parts; the irritation of pebbles, thorns, dirt or other foreign substance caught between the claws; and sometimes a general scrofulous character of the constitution.

Symptoms.—These are evident in the lameness of the animal, and in the condition of the foot. Where it arises from a scrofulous condition of the blood, it is apt to be associated with the signs of consumption, as described on page

287. In these instances the efforts at cure will not be likely to prove successful.

Treatment.—If attended to in time, the disease is not difficult to manage, except when it is owing to scrofula. All loose horn should be removed, and all dirt and foreign substances. The wound, if much inflamed, should then be poulticed for a day or two; and after that dressed with one of the astringent applications given below (Nos. 357–9).

If the pus has burrowed much in the surrounding tissue, it is best to syringe the foot thoroughly with a solution of carbolic acid, one part of the acid to ten or twelve of water; and having done this, soak small pledgets of tow in the solution and fasten them in the wound with bandages. The animal should be kept in a clean stable, or on a dry, short pasturage.

Some neglected cases are met with, where the foul has extended into the foot and up as high as the fetlock; the claws are separated by the swelling, the bones are attacked and rotten, the stench is overpowering and the animal "dead lame." Cattle so troubled will give up the struggle for life; will refuse their food, lose flesh, lie down and die.

But even such desperate cases may be often cured completely by *amputation*—taking off the foot through the fetlock joint; or, if this is too diseased, by sawing through the canon bone above it. This is not a difficult nor dangerous operation, and gives the owner a chance to feed up the animal for the butcher, which should be done as soon as possible. The animal should be cast, a sharp knife used, and abundantly long flaps of sound skin and flesh be left on each side of the limb, to fold over and cover the ends of the bone. Bleeding should be prevented by a *tourniquet*, and the arteries carefully tied. Carbolized water is the best dressing for

the stump, as it is not only disinfecting and healing, but keeps away the flies.

Of local applications to foul claw there are many, as:—

No. 357.	Oil of turpentine.	
	Lard, of each	4 oz.
	Powdered sulphate of copper,	1 oz.

Melt together the lard and turpentine and add the copper.

No. 358.	Carbolic acid,	1 drachm.
	Water,	6 oz.

Apply by a brush or feather, and cover with a piece of tow wet with it.

No. 359.	Chloride of zinc,	10 to 20 grains.
	Water,	1 oz.

Use as the last.

Saturated solutions of alum, or of sulphate of copper, or the sulphate in crystal, or the pencil of nitrate of silver, may also be used to remove the diseased slough. Mr. Youatt's suggestion of a poultice mixed with one-fourth oil of turpentine is useful where it is difficult to cleanse the hoof.

LICE, TICKS, AND OTHER VERMIN.

Cattle, cows and calves, especially when in poor condition, are very subject to attacks of several species of lice, and as these pests propagate with incredible rapidity, they infect other stock as well as the stables and barns. Hence, no time should be lost in attacking them vigorously; and at the same time the cattle are treated, the stables should be thoroughly cleaned and whitewashed, and the posts, stones and other scratching places be painted with crude petroleum or gas tar.

On a previous page (260) we have suggested various remedies for lice in horses, any of which may also be used in cattle. None, however, of a poisonous character should be used on these latter animals on account of their habit of licking themselves, and each other. A useful wash, and a justly popular one, is a strong decoction of tobacco leaves,

saturated with rock salt. With this the hide should be well saturated several times at intervals of three or four days. This repetition is absolutely essential to success, as the nits in which the lice store their eggs, and which can readily be seen fastened to the hair, have a covering of a waxy material wholly insoluble in water or mild alkalies. They all hatch out in a week or ten days, and by repeating the wash, the young are killed before they have had time to deposit other nits.

The covering of the nits is, however, readily soluble in alcohol. Therefore, the most effective of all louse-killing preparations are made by pouring common spirits of some kind on tobacco leaves, allowing it to stand for a few days then bottling for use. Such tinctures of stavesacre seeds, and of cocculus indicus are also very promptly destructive to vermin of all kinds in the hide and fleece of animals; but these two last mentioned drugs are actively poisonous when taken internally, and must not be carelessly used. It may be said of the cocculus, that it is so intensely bitter that we question whether a cow would lick her hide with that flavor on it.

An excellent and cheap oily preparation is :—

No. 360.	Linseed oil,	4 parts.
	Common creasote,	1 part.

Mix well together.

Another is :—

No. 361.	Flowers of sulphur,	1 lb.
	Oil of turpentine,	½ pt.
	Train oil,	4 pints.

Mix the sulphur with the train oil by gentle heat, and when cold stir in the turpentine.

Ticks which infest live stock should not be pulled off, but snipped in two with a pair of scissors, and the head half which remains touched with a feather dipped in oil of turpentine.

No. 362.	Common carbolic acid,	1 oz.
	Whale or neats foot oil,	1 qt.

Mix for outward use.

This both destroys vermin and keeps away flies from animals.

CHAPTER III.

DISEASES OF THE COW IN PREGNANCY AND CALVING.

Barrenness or Sterility.
Abortion—Slinking—Slipping—Dropping the Calf.
Calving or Parturition; Rigid Neck of the Womb; Bending of the Neck of the Womb.
Unnatural Positions of the Calf.
Flooding.
Retained After-birth.
Inversion of the Womb.
Medical Treatment of Calving.
Management of the Milk; To dry the milk; To bring on or increase the milk; To correct bloody and blue milk.
Milk Fever—Puerperal Fever—Parturient Fever—Parturient Apoplexy—Inflammation of the Womb.
Garget—Caked Bag—Mammitis.

BARRENNESS OR STERILITY.

Barrenness in high priced cows, bought or raised for the purpose of breeding, is a serious loss to the owner, and it is worth making energetic attempts to remedy it. Its causes are either constitutional or accidental.

Constitutional barrenness generally exists in heifers twinned with a bull calf. They are called "free martins," and rarely go in heat, and when they do, they fail to conceive. Usually they have a steer-like appearance, though smaller in growth. When their sex organs are examined they are found to be small and ill-developed.

Incomplete growth of the ovaries and malformations of the genital organs, are other constitutional causes of sterility found occasionally in the lower animals. It is needless to say that any attempt to remedy these defects are vain.

Accidental barrenness is quite frequent. In the large majority of cases it can be traced directly to improper food or exercise. This does not mean insufficient food. On the contrary, probably the most common of all causes of barrenness in cows is overfeeding—to which the most valuable animals are for obvious reasons most exposed.

It is well ascertained that a fat heifer is slow to heat and uncertain in conception. Such animals should be turned out on a poor pasture with a young bull. This will often succeed in cases given up as hopeless.

Lack of exercise is another common cause. Many instances might be quoted where a barren cow, after driving a hundred miles and then turned in with a bull, bred in a short time. Part of the effect of this may be owing to change of climate. For it has often been noticed that cows barren on the low lands have bred when changed to a hilly, bracing upland pasture; or from the interior to the seashore.

Fatty and sweet food, such as oil cake, sugar cane, sorghum, etc., have a tendency to prevent the proper change of the ovaries; indeed, they are asserted to bring about a fatty degeneration in their substance, and thus lead to permanent sterility.

Causes of an opposite kind are too great delicacy of constitution, and a lack of vigor either from a wasting disease, over-milking or absence of nutritious food. In the first stage of consumption cows generally heat violently and repeatedly, but do not conceive.

The general treatment of barrenness will be suggested by the above remarks. When it appears to be owing to excessive fat, a full dose of sulphate of magnesia, repeated two or three times at intervals of a week, will aid in bringing the animal to proper condition. Good breeders should be only in good flesh, without being forced. Not only do they take the bull more regularly, but they have healthier calves, and are less liable to drop them prematurely.

Of course, the barrenness may be due to the bull. If he is excessively fat or lean, or old, or diseased, it may interfere with his procreative powers; so that a cow which seems well fitted for conception, and yet remains barren, should be served by different bulls. It has been supposed by some writers that a perfectly healthy cow may fail with an equally healthy bull, and yet take with another one. This appears to occur, for example, where the relationship is very close.

ABORTION—SLINKING—SLIPPING—DROPPING THE CALF.

The premature dropping of the calf usually occurs from the fourth to the seventh month. It frequently becomes epidemic in a dairy, and the immense loss it entails on farmers may be judged from a statement made some years ago by the New York State Agricultural Society, that in that State alone the money value of the loss had been for several years over *four million* dollars annually.

Within the last few years many of the most important dairy regions of New York, Pennsylvania and other States have suffered severely from this malady, all the cows sometimes aborting, one after another, without discoverable cause or cure. Nevertheless it is a complaint which, by judicious precautions and early and active treatment, can be prevented and checked.

Causes.—In studying the causes of the disease the stock owner should first examine into the *food* of the animals. It has been abundantly shown that wet, frosted and mouldy fodder, smutty or mouldy grain, ergoted corn or rye, and, on the other hand, too rich food, will strongly predispose to slinking. Heating condition powders, violent purges, blows on the belly, over teazing by the bull, are other and common causes.

Next to these comes the presence of a foul atmosphere in the cow-house, yard or field. Decaying animal matters, as

the refuse from a slaughter house, glue factory or hatters' establishment, should be most carefully guarded against.

The third and most important of all causes, as it is the true secret of the epidemic prevalence of abortion in a dairy, is the odor of the lochia or uterine discharges of the cow in abortion. This odor is easily detected the moment one enters the cow yard, and it is peculiarily offensive to other cows. They cease feeding, sniff the air, become excited and bellow. Some sympathetic influence is produced on their uterine organs, and in a few days one or more of them abort, and thus the disease is propagated through the herd until sometimes every cow in calf has dropped her fetus.

Symptoms.—An aborting cow is a constant source of danger to a dairy, and whenever such a one is found in the herd, she should be taken off her milk, fattened and killed. But, as in buying new cows, the purchaser may obtain one, it is of great importance that he should closely watch cows in pregnancy, and, at the first signs of abortion, separate the cow from the rest of the herd. These signs are as follows:

The animal is noticed to be off her feed, to "lose her cud," is listless and dull, the milk dries up, she lies down longer than usual, stands for a longer time on rising, and walks with a slight staggering gait. Or in other cases, she is uneasy, paws the ground, refuses food and rests her head on the manger.

If at this time the belly is carefully examined, it will be found slightly altered in shape, less round and somewhat enlarged. And if the vagina should be inspected, there will be observed a slight discharge of whitish, glairy fluid; or, if further advanced, the fluid will be of a yellow or reddish hue.

These are the signs which should admonish the owner to isolate the cow at a long distance from her companions.

Later on, the animal begins to moan, the pangs of labor come on with more or less violence, and the fruit of the womb is expelled, sometimes living, but generally dead, and often putrid and escaping by piecemeal.

Treatment.—This is largely indicated by what we have said above, so far as the prevention of the epidemic is concerned. But there is one precaution which cannot be too strongly urged. That is, as soon as the abortion has once commenced, proceed to deliver the fetus at once, and bury it deep in the ground, sprinkling it freely with carbolic acid or chloride of lime. We need here not merely a disinfectant, but one with a powerful smell of its own to overcome the odor of the lochia.

The cow should then receive attention. The afterbirth having also been removed and buried, the vagina should be syringed with a solution of chloride of lime, one ounce to the quart of water; the stall should be cleaned, washed with the solution, and freshly littered; and for a month at least, the cow should not be allowed to associate with others. The whole herd should at once be put upon doses of *chlorate of potash*, $\frac{1}{2}$ oz. daily, which it is believed has been proven to exert a beneficial influence.

After recovery, the cow should not be allowed to take the bull until the third or fourth time she is in heat, as if she conceives in her first or second heat, it is quite certain that she will abort again. If on her next pregnancy she again aborts, there should be no hesitation in at once fattening and selling her, as she is a standing menace to the welfare of the whole dairy.

Recent discussions in the Agricultural Societies of New York, Ohio, and other large dairy districts, have led to the recognition of two important and avoidable causes of abortion. One of these is a deficiency of mineral matter in the

food. This can be remedied by giving each cow during her pregnancy one quart of corn meal, with a teaspoonful of fresh, finely ground bone every morning. It is no unusual sight to see cows knawing at old bones to satisfy this natural want of the system.

The second precaution is to have a bull who is not exhausted. He should have served no cow for a week, and should be put to the female in the evening, and but once. The cow should be stabled by herself for the night, and kept away from the bull, or teasing steers, during the whole of her pregnancy. She should be dried at least six weeks before her calving date

It should be added that the latest discussions of the subject endorse the opinion of Mr. Youatt, that the odor of the vaginal discharges accompanying abortion are highly irritating to the uterine system of other pregnant cows.

CALVING OR PARTURITION.

In most of the lower animals the process of child-birth is one consummated with little pain, and few complications. In the cow, however, more frequently than in any other animal, the assistance of man is called for; and this appears to be especially the case in high bred and delicately nurtured animals.

It should be a rule, however, to avoid giving assistance until is is really necessary. Frequently by waiting patiently, nature will succeed in overcoming obstacles to the exit of the calf, which we might only injure by premature attempts at interference. So long as the bag of waters has not burst, there is no occasion for action, providing the passage of the vagina is clear, and the womb is in a healthy condition. The latter is subject to two irregularities, both involving what is called the *neck* of the womb, which is that portion immediately above its *mouth*, or external opening, into the vagina.

1. *Rigid Neck of the Womb.*

This is the condition called in old farriery books by the curious term "the horning of the lye," because the lye, calf-bed or womb is found to present a stiff, horn-like end in the vagina. It may be suspected to be present when the cow is at her full time, when she has labor-pains, and when there is a delay in the descent of the calf. On oiling the hand and introducing it into the vagina the neck of the womb will be felt as a hard body at its furthest extremity, the mouth being small and unyielding.

Treatment.—If time does not press, and the cow is not excited, some extract of belladonna should be carried up the vagina and smeared around the neck. Sometimes this will cause it to relax in a few hours.

But if the case is pressing, there is no use experimenting with this means. A narrow-bladed, blunted-pointed knife should be carried up the vagina in the hand, the mouth of the womb felt for and fixed with the fore finger, and then the blade of the knife slipped along the finger until it enters the neck of the womb to the depth of about a quarter of an inch. A slight cut should then be made on all four sides of the neck by turning the knife. A mere nick is enough, as the mouth once loosened in its contraction the neck will soon give way, and the bag of waters will accomplish the dilatation.

2. *Bending of the Neck.*

This is a form of accident not occurring in child-birth, except in the cow. The neck of the womb is twisted so as to bring the mouth upward or to one side, and prevent the expulsion efforts of the womb acting in the direction of the canal of the vagina. It may be suspected to exist when labor pains continue for some time without the appearance of the bag of waters. On feeling with the hand, no mouth of the womb will be discernable.

To relieve it, the cow should be cast with her head up hill; the surgeon should introduce his hand, and pressing on the fetus through the walls of the womb, push it firmly in the opposite direction from which the bending is; while one or two men should roll the cow briskly over on the other side in the direction in which the twist has taken place. This may have to be repeated several times, but will generally succeed in releasing the mouth from its unnatural position.

UNNATURAL POSITIONS OF THE CALF.

The natural position of the calf on its exit from the womb is with its head and fore feet first, the head between the feet and the back upwards. Six unnatural positions are enumerated by writers, which demand the assistance of the surgeon. We give them in the order of their frequency, with the appropriate treatment they require.

1. *Position with tail first.*

Press the haunches flack with the palm of the hand, take hold of the bend of the hough of one leg, pull at it and reach the foot. Seize the other foot in the same manner, bring them forth and deliver the body.

2. *Position with fore feet appearing without the head.*

Push the feet back until the head can be seized, either by the jaw or nose, and pull it down between the feet. No further aid will be required. This needs a long arm, and prompt action between the pains.

3. *Position with belly upward, head over one shoulder, fore legs first.*

Gently push the calf back between the pains, and bring the head down between the legs.

4. *Fore feet first, with head under the brisket.*

Push the calf back, find the head, and draw it down between the fore feet.

5. *Head alone, or only one fore foot with it.*

Push the calf back and search for the fore feet or foot, under the belly; when found, bring forward one at a time, by placing the hand under the knee and using gentle pressure.

6. *Belly upwards, the fore legs folded and against the mother's back, the head, side or hind leg appearing.*

If the hind leg appear, put it back; seek for the head, and if possible turn the calf, to bring the fore feet and head to the mouth. When this fails, throw the cow, put her on her back, and with a rope and pulley, or two or three stout assistants, raise her hind quarter considerably higher than her shoulders. In this position the calf may be easily pushed back in the uterus so that it can be turned and brought to the natural position.

Many surgeons make it a rule to fasten the part presenting with a cord and slip knot before going in search of the part they desire to bring to the mouth. The cord is held by an assistant, and serves as a guide.

The principal obstetric instrument in the cow is *the hook*. This is made of wrought iron, four inches long, with a loop for the cord at the straight end. When by no other means the calf can be delivered, or when removing a dead fœtus, this hook is fastened in the socket of an eye, under the jaw or in an ear, and by gentle and steady traction the resistance is overcome.

Finally, the fœtus may have to be taken out piecemeal, an operation which requires considerable skill on the part of the operator, to avoid wounding the womb and vagina, when he is dissecting the calf.

In all such operations certain general rules should be observed, as follows:—

1. Thoroughly anoint the hand with lard or oil, before introducing it into the vagina.

2. Make the examinations while the cow is standing, and between the pains.

3. In pulling at the feet, enclose the claws in the hollow of the palm, so that they will not tear the delicate coats of the womb.

FLOODING.

Sometimes after a natural birth which has been rapid, and often after an abortion which has been brought on by violence, there is a severe attack of "flooding," or bleeding from the womb. It may escape from the vagina, or it may be indicated by paleness of the mouth and nose, weak pulse, great weakness and coldness of the surface, and the womb be found to be filled with clotted blood.

Treatment.—The hand should be introduced into the womb, the clots and any remaining portion of the afterbirth seized and extracted, and a sponge dipped in hot vinegar and water, or very hot or very cold water alone, be wrung out in the uterus. A full dose of fresh ergot of rye, one to two ounces, should be given without delay.

If these measures fail, a piece of ice the size of a walnut should be carried into the womb and left there; or a teaspoonful of powdered alum should be stirred in a teacupful of milk, and a spongeful of this be squeezed out in the womb. Internally, Prof. Gamgee, recommends for either the mare or cow—

No. 363. Compound tincture of cinnamon, 3 oz.
Dilute sulphuric acid, 5 oz.

Mix and give two tablespoonfuls for a dose every one or two hours, in a quart of water.

RETAINED AFTERBIRTH.

A variety of causes may lead to the retention of the afterbirth. Sometimes it is firmly adherent to the walls of the womb; at others it is owing to hurried delivery, poverty of condition, etc. Should it be left, it is liable to putrefy, causing a fetid discharge which exhausts and poisons the animal, and vitiates the air of the whole barn.

A retention for a few days in the cow does no harm under ordinary circumstances. But if it is protracted longer than that the hand should be introduced, and the afterbirth separated carefully from the walls of the uterus, by a process of peeling it off, and gradual but firm pulling. When it has been removed, a solution of chloride of lime, an ounce to the quart of water, should be thoroughly syringed into the vagina; a moderate purge of salts should be given; and if there is a tendency to bleed a full dose of ergot, two ounces of the powder may be administered.

INVERSION OF THE WOMB.

This serious accident occasionally occurs when there is excessive and persistent straining. The womb, or "calf-bag," as it is called by the cow-leech, follows the calf, and hangs forth from the birth-place in the form of a large red or violet-colored bag. Sometimes the accident is not discovered for an hour or two, when the womb will be found dirty, thick, purple-colored, and gorged with blood.

The treatment is to clean the bag thoroughly, by free drenching with warm water; and if it is swollen and gorged with blood, it must be punctured in a number of places with a sharp-pointed knife, just deep enough to bring about a discharge of the overloaded veins. When sufficient blood has been lost, the bleeding should be stayed by cold water, and two assistants should place a cloth underneath the bag and

lift it to the level of the vagina. The operator then oils the surface of the bag, and places his right hand, also well oiled, against the point or horn of the bag which is furthest from the vagina, and by pressing gently but steadily on it returns it into the vagina, and presses it up as far as possible. With his left hand he now presses on the most dependent part, in a similar manner, and forces it up. The assistants follow the re-entering bag and keep it from again extruding. And thus, often after considerable labor, the whole is returned.

Such an accident is, however, very apt to recur; and to prevent it the vagina should be filled with a ball of tow, and this retained in place by a band fastened to a collar around the cow's neck, and kept in place by straps, passing above and below, to a girth in front of the udder.

If the replacing is interfered with by continued severe labor pains, the cow should at once have half an ounce of chloroform and two ounces of laudanum, in a quart of milk.

After the operation, the cow should be kept very quiet, and the bowels restrained by doses of laudanum for a day or two. After twenty-four hours, if the pains have ceased, the bandage may be removed.

In preventing falling of the womb the great point is to keep the hind quarters of the cow in a raised position during parturition and for some hours afterward; in fact, until the afterbirth has come away. This may be done to some extent by making a thicker bed of litter at the tail. In some high-class German cow houses, where the cow receives, and comes to require, about as much attention at these periods as the human female, the floor of the "lying-in stall" slopes toward the rack, so that the hind quarters are constantly elevated.

MEDICAL TREATMENT OF CALVING.

Generally speaking, as an aid to birth giving, medical treatment is not necessary; the offspring coming naturally, at the full period, can generally be got hold of by the hand, and brought away with gentle force, or by waiting, will emerge without assistance.

Nevertheless, when the labor pains are languid, and occur at long intervals, and where the animal has been in labor for a considerable time, and it is found on examination that there is no obstruction, a natural position, and a dilated mouth of the womb, full doses of *ergot*, one to two ounces, should be given. This drug does not act very efficiently on cows, and has to be administered in large doses.

Another instance where medicine is needed is where, both in mares and cows, there is considerable irritability and straining after the birth has come away. Unless it subsides promptly the animal should have the following draught:—

No. 364. Chloroform,
Laudanum, each ½ oz.

Give in a quart of warm milk, and repeat every hour until relief is obtained.

Sometimes this irritability shows itself in repeated spasms or convulsions. The above mixture is then very applicable; but if there is a dry muzzle and a hot horn, showing a tendency to a feverish condition, the following is preferable:

No. 365. Sweet spirits of nitre,
Laudanum, of each 2 oz.
Solution of acetate of ammonia, 4 oz.

Give in a quart of milk every hour, till relieved.

Some cows, especially those in low condition, for a week or two before calving lose the power of their hind limbs, and are unable to stand. Little can be done before they give birth, besides allowing them laxative and nutritious food and tonic medicine, while seeing that they are well bedded and

turned over several times a day. After calving, most cases gradually regain the use of their limbs; but when this is not the case, or they gain too slowly, the following may be used with every prospect of prompt advantage:—

No. 366. Powdered nux vomica,
Sulphate of iron, each 2 drachms.
Give in a pint or two of gruel, twice a day.

Mustard should be well rubbed in over the loins, and the animal forced to rise on her feet as soon as she is able—which she is often by no means willing to do.

The older veterinarians were accustomed to give to all cows, after calving, what they called a "cleansing drink," on the ground that it prevented milk fever and other illnesses. The modern school does not approve of these, believing that they are generally needless and sometimes hurtful, by bringing on irritation of the bowels, or by weakening the animal. We give two of the least objectionable of these drinks, which, being warm and stimulating, are not out of place in conditions of unusual debility:—

No. 367. Powdered aniseed,
" myrrh,
" allspice,
" cummin seed, each, 1 oz.
To be stirred in a quart of warm gruel, for a drench.

No. 368. Soap,
Spermaceti,
Powdered ginger, of each, ½ oz.
Aniseed, in powder,
Carraway seed, " of each, 1 oz.
Molasses, 4 oz.
Give in a quart of warm gruel.

It is sufficient, however, to prevent constipation, if present, and to cleanse the vagina by an antiseptic wash if the discharge is foul. For the first we recommend:—

No. 369. Sulphate of magnesia, ½ lb.
Ground aniseed, 1 oz.
Olive oil, 6 oz.
Give in a pint of gruel, and repeat daily, if needed.

For syringing the vagina, stir a pound of chloride of lime in two gallons of water, and when it has settled pour off the clear fluid, for use. Or, pour a gallon of boiling water on a pint of clean wood tar, stir and let it settle. Either of these will prove a cheap and excellent cleansing wash. A pint or two should be thrown up twice a day.

Instead of constipation, some cows after calving are troubled with a relaxed condition of the bowels, with constant diarrhea, which prevents them from promptly regaining strength. For this condition Mr. Finley Dun recommends one of the following astringent, anodyne drenches, as among the best that could be selected :—

No. 370.	Powdered catechu,	2 drachms.
	" ginger,	1 oz.
	Sulphuric acid,	30 drops.
	Laudanum,	1 oz.

Give in a quart of gruel, ale, or weak whisky and water.

No. 371.	Powdered ginger,		
	Bicarbonate of soda,		
	Laudanum,		
	Decoction of oak bark,	of each,	1 oz.

Give several times a day, in gruel or ale.

Half this dose suffices for six months' calves, in similar conditions of the bowels.

MANAGEMENT OF THE MILK.

The management of the secretion of the milk divides itself into the three subjects:—the means of drying it up when the cow is about to calve, or is to be fattened; the means of increasing the supply when it is deficient; and its improvement when in an unhealthy condition.

1. *To dry the milk.*

The average period before calving at which a cow should be allowed to go dry is about six weeks. Poor and weak

cows should have two months, while one month is enough for vigorous ones.

Usually by lessening the milk taken day by day, so as always to leave some in the udder, a cow will dry without painful swelling of the gland. When this is too long delayed, the customary "drying drench" is to boil half an ounce of powdered alum in a pint of milk, and give it every morning. Rubbing the udder with ointment of belladonna is also an efficient and safe means.

2. *To bring on or increase the milk.*

It occasionally happens that the secretion of milk, especially in heifers, is too slight in quantity for the calf, or is backward in making its appearance at the proper time. Nourishing and abundant food, with a change of diet, will generally remedy this, along with gentle frictions of the udder and teat, so as to excite the glands to greater activity.

When the secretion is checked, a large poultice of the leaves of the castor oil plant, chopped fine and applied every morning, has considerable local celebrity. A prescription, in such cases, recommended by Prof. Gamgee, is—

No. 372. Black sulphuret of antimony, 2 oz.
Powdered fennel seed,
Common salt, of each 4 oz.

One quarter of this to be mixed with the food every day.

3. *To correct bloody and blue milk.*

Bloody milk comes from blows on the udder, certain poisonous plants, from the sexual heat, and garget.

When it appears, it is a safe rule to give the cow a dose of salts, and to foment the udder in hot water with a little vinegar added. The milking should be gentle and thorough, and the diet altered so as to avoid any unknown irritating substance she may have been eating.

Blue or sticky milk is due to the presence of a low form of vegetation in the secretion, easily seen under a microscope

of moderate power. It is supposed to be introduced through impure drinking water, diseased grasses, or by breathing an air tainted with decomposing animal matter. In addition to boiling the drinking water, and changing the food or pasturage, the animal should take—

No. 373. Bisulphite of soda,
Sulphur, each 2 drachms.

Give in milk or mixed with meal, once a day, for a week.

MILK FEVER—PUERPERAL FEVER—PARTURIENT FEVER—PARTURIENT APOPLEXY—METRITIS—INFLAMMATION OF THE WOMB.

Definition.—An inflammation of the lining membrane, substance of, and tissues adjacent to, the womb, occurring after calving, and often accompanied by sudden and marked affections of the brain, congestion of the spinal cord and apoplexy; and often followed by general blood poisoning and death.

Causes.—These may be injury to the womb in calving, retained afterbirth, exposure to colds and chills; or it may be at times of an epidemic character. A cow who has had it once is pretty certain to have it with her next calf.

There has been considerable discussion as to whether the disease called "parturient apoplexy" and "milk fever" is identical with that known as inflammation of the womb or metritis. Several very eminent authorities do not think so; and they explain the congested and inflamed state of the womb, which is found on examination after death by reference to the nearness of the time of its outbreak to calving. But after a careful study of the evidence and the records of cases and post-mortems, the present writer inclines strongly to the opinion that the difference is only in respect to the violence of the disease; a difference very noticeable also in the human species in the different forms of puerperal metritis.

Symptoms.—The symptoms first appear within from twenty-four hours to three days after calving. One of the earliest warnings is the suspension of the secretion of milk. This is the more observable as the disease is peculiarly liable to attack "deep milkers," large uddered and well nourished cows.

Frequently the other symptoms appear with promptness and severity, and run rapidly to a fatal termination. The cow hangs her head, ceases to feed, loses her cud, and moves restlessly her hind feet. By and by the breathing becomes hard and rapid, the eyes are bloodshot and wild, the eyelids twitch, and tears run over the face. She falls on her litter in a stupor, or sways her head violently from side to side. The head, horns, and forehead are intensely hot to the touch.

The power of sight and of swallowing is lost early in the disease, and there is often partial or complete paralysis of the hind quarters. The pulse, at first full, becomes small, quick and scarcely perceptible. There may be delirium and death in convulsions; or the animal may quietly gasp to death in a state of stupor.

The bowels may be somewhat relaxed in the early stages, but as a rule constipation is a marked sign. It is due to paralysis of the bowels. The urine is generally pale in color, scanty in quantity, and may be retained in the bladder, from paralysis of that organ.

If in the course of thirty or forty hours the animal comes to herself and tries to rise, if the bowels begin to act and the secretion of milk to return, there is a fair probability that the case will recover; although sometimes these favorable symptoms are deceptive, indicating only a remission of the disease, which returns with renewed violence. For this reason it is well not to be too confident in one's predictions about results.

Treatment.—If the symptoms do not indicate very decided exhaustion, and the case is seen early, from three to five quarts of blood should be taken from a free opening in the jugular vein. If as the blood flows, the pulse is felt to grow fuller and stronger, and there are signs of relief to the head, it is certain that the loss of the blood is a benefit.

Where, however, the pulse is weak and thready, and the exhaustion is already great, bleeding is not called for. On the contrary, a stimulant is what is required. This may be whisky, or—

No. 374.	Carbonate of ammonia,	1 oz.
	Water,	1 pint.

Mix for a drench.

As there is so often paralysis of the muscles of the gullet, so that the animal cannot swallow, it is by no means easy to give a drench. Sometimes a ball does better, as it can be well oiled and pushed far back in the gullet, and will dissolve and descend by its own weight.

In all cases, if an active purge can be administered, it will be an advantage, as—

No. 375.	Sulphate of magnesia,	½ to 1 lb.
	Croton oil,	20 to 30 drops.

Give in a quart of water.

If the difficulty of giving by the mouth is very great, injections of soap and warm water should be repeatedly thrown into the rectum.

The swelling of the bowels, which is apt to be very painful, can be lessened by carbonate of ammonia given as a ball; or that failing, the rumen should be punctured by a trocar, and the gas allowed to escape.

When the horns and head are hot, or when the stupor is marked, pouring cold water on the head from a height of five or six feet, and continuing several minutes (ten or fif-

teen) will often prove a very efficient means of restoring consciousness.

The paralysis is liable to remain after the other symptoms have disappeared, and indeed the cow may fancy she cannot rise when she is perfectly able to do so. The application of the firing iron to the loins will be sure to start her in motion, if she is able, and to benefit her by counter irritation if she is not.

In cases of inflammation of the womb and surroundings, where the attack comes on three or four days after calving, the following is an excellent laxative, alterative and sedative combined:—

No. 376.	Calomel,	½ drachm.
	Laudanum,	2 oz.
	Castor oil,	1 pound.

Mix with hot water and molasses, and give four doses, at intervals of two or three hours.

In the apoplectic form of the disease, when there is intense nervous excitement and violent cramp of the muscles of the hind quarters, *chloral* has been found to be of great benefit:—

No. 377.	Hydrate of chloral,	
	Powdered sugar,	each 2 oz.

Mix in a quart of warm water, and repeat in two hours unless quiet is produced.

Another useful formula in this phase of the disease, when the period of excitement is followed by exhaustion and stupor, is given by Mr. Finlay Dun:—

No. 387.	Spirits of turpentine,	1 to 2 oz.
	Carbonate of ammonia,	½ oz.

Give in a quart of cold gruel.

GARGET—MAMMITIS—CAKED BAG.

Definition.—An inflammation of the udder or mammary gland in the cow.

Causes.—Cows in a plethoric condition at the time of calving, or if at that or other time they be turned into a rich pasturage, are liable to swelling and inflammation of the udder. Allowing them to go unmilked for long periods also produces it. Sometimes this occurs through inattention; sometimes for the barbarous purpose of making them appear remarkably well uddered when put on sale.

Symptoms.—The inflammation seldom attacks the whole of the udder, but is confined to one or two quarters, and is indicated by swelling, heat, pain and redness of the part inflamed, and by the alteration in the milk, which is curdled, whey-like, and mixed with blood. There is generally considerable constitutional disturbance, such as restlessness, impaired appetite, shiverings, succeeded by heat of skin and disordered bowels, either constipated or unnaturally loose.

The inflamed parts generally pass into suppuration, which results in breaking down their structure, wasting and transformation into a hard, cartilaginous substance. The capacity for giving milk is thus impaired, and the market value of the cow diminished.

Treatment.—The general treatment is to give a moderate purge, say half a pound of salts, and follow this up with two ounces of saltpetre in the water, morning and night. No great amount of water, however, should be given, and dry food, and such as does not produce milk, should be the only kind allowed. This is essential to success, as it gives rest to the inflamed structure.

The milk must be frequently drawn with the hand or with the syphon. The whole o fthe udder should be rubbed with:

No. 379.	Powdered camphor,		½ oz.
	Extract of belladonna,		
	Lard,	each,	2 oz.

Mix well together and apply with gentle friction.

Should the swelling be great, and the weight of the udder painful, it must be supported by a broad bandage, made with holes for the teats to pass through, and then securely fastened over the back of the animal. When the case requires it, a large mush and hop poultice can be placed within the bandage, over the udder.

If the inflammation cannot be reduced, but passes on to suppuration, and abscesses form, they must be freely opened, the pus allowed to escape, and the cavities syringed with carbolic acid water, after which they can advantageously be dressed with stimulant and antiseptic ointments, as—

No. 380.	Sulphate of copper, powdered,	1 drachm.
	Lard,	1 oz.

Or :

No. 381.	Chloride of lime,	1 to 2 drachms.
	Lard,	1 oz.

For the hard swellings which remain when suppuration does not occur, repeated gentle frictions with the following are useful :—

No. 382.	Iodide of sulphur,	1 drachm.
	Glycerine,	6 oz.

Or with the following, which has recently been very highly praised as efficient in dispersing all sorts of hardened and painful swellings in glands and joints :—

No. 383.	Oleate of mercury,	1 oz.
	Sulphate of morphia,	8 grs.

Mix well, and rub on with the finger, or apply with a brush, every one or two days.

This is not liable to cause salivation if used with ordinary care.

The common poke (*Phytolacca*) has a local reputation in

various parts of the United States, as efficient in acute garget. Indeed, it is sometimes called the "garget weed." It is given by mixing a handful of the dried leaves with the food, and rubbing the udder with an ointment prepared by simmering a few ounces of the bruised root with a pound of lard, and straining.

For hard and slow indurations or "knots," that remain after the affection, Prof. Gamgee uses—

No. 384. Iodide of mercury, ½ drachm.
Glycerine,
Alcohol, of each, 4 oz.

Rub gently and thoroughly with this, every two days.

This, or any other form of iodine ointment will answer; but after severe attacks the udder is often permanently injured, and the cow's capacity for giving milk incurably diminished.

After slight attacks of garget the teats are often obstructed and narrowed. They may be enlarged by inserting a well oiled quill with a circular leather collar about an inch in diameter. This can be kept in place readily by a piece of sticking plaster, and removed when milking; if worn for a week or two it will relieve the contraction.

In all cases it is of the greatest consequence to keep the udder empty by repeated milkings. As the teats are tender and swollen this must be done gently. The calf will often succeed better than the attendant. In England a "teat syphon" is manufactured for drawing the milk by exhaustion of air in a receiver. If the milk is "caked" in the udder, injections of a saturated solution of bicarbonate of potash in warm water, with a small syringe with a long nozzle, is recommended by English authorities.

CHAPTER IV.

DISEASES OF CALVES.

First Attentions.
Diarrhea or Scouring.
Epidemic Colic—The Shoote or Shewte of Blood.
Croup.
The Husk or Hoose—Parasitic Bronchitis.

FIRST ATTENTIONS.

Immediately after she has dropped her calf, the cow should occupy herself in licking and cleaning it. If she neglects this maternal duty, the calf should be sprinkled with a little salt, which will induce her to perform it.

The calf should remain with its mother for a few days at least, in order to derive the benefit of the first milk, which is laxative in quality and gives the little animal the purge which it needs in order to clear its bowels of the black and glutinous feces which have accumulated there.

Occasionally the mother in severing the naval string with her teeth leaves it so that it bleeds. It should then be tied with a strong thread; and if the navel looks inflamed, it is well to smear it with petroleum ointment, or oxide of zinc ointment, or other soothing application. If there is a tumor which threatens to break, it should be lanced, and dressed as heretofore directed for abscesses, (page 227).

DIARRHEA OR SCOURING.

This common affection in calves is, through neglect and mismanagement, a cause of heavy mortality among them. It arises, as a rule, either from too rich or too poor food, and the dam should be looked to in this respect, as well as the

calf. Heating the cow by driving or worrying her is another common cause of deterioration of her milk, and renders it injurious to the delicate bowels of the young calf.

It is often best to begin the treatment with two or three ounces of castor oil, in which a teaspoonful of powdered ginger is stirred, as the gentle action of this laxative will clear the bowels of irritating substances. When this is done, the following will be found an admirable combination :—

No. 385.	Lime water,	
	Infusion of gentian, of each	2 oz.

Give this amount two or three times daily, to a feeble calf.

The infusion of gentian is made by boiling one ounce of bruised gentian root in a quart of water for ten minutes, cooling and straining.

Or the following will answer without the oil :—

No. 386.	Calcined magnesia,	4 drachms.
	Powdered opium,	20 grains.
	Powdered rhubarb,	2 drachms.

Give in milk or linseed gruel.

Either of these is better than the giving of astringents, as some negligent practitioners do. These should be reserved for cases where the above remedies, together with attention to the mother and a change of diet, does not succeed. It will then be proper to give the following :—

No. 387.	Prepared chalk,	2 oz.
	Powdered catechu,	1 oz.
	Powdered opium,	2 drachms.
	Powdered ginger,	2 oz.

Mix in a pint of sweet flag tea or peppermint water, and give a teacupful once or twice a day.

Strong teas of oak bark or willow bark, with the addition of ginger, or sweet flag (calamus), are popular and useful remedies in such cases.

EPIDEMIC COLIC—THE SHOOTE.

This is a form of colic very fatal among calves in some localities, usually attacking them a few days after birth. It is believed at times to be epidemic, as it is found to attack rapidly a number of calves in a herd. Its cause has not been ascertained.

Symptoms.—The calf refuses its food, is listless and weak. Soon it is attacked by severe gripings, of an intermittent character. These are followed after a time by a violent discharge from the bowels. These attacks of colic and excessive watery evacuations continue to recur until the animal dies of exhaustion; or else, after the first few discharges, the pain abates and the symptoms disappear.

Treatment.—The usual treatment with breeders is to administer, as early in the disease as practicable, a mixture of eggs, wheat flour and linseed oil; or of milk mulled with eggs and whiskey.

Should this fail, a dose of a drachm of essence of ginger, with two drachms of laudanum, in gruel, should be repeated until the colicky symptoms are overcome by the narcotic.

CROUP.

Definition.—An inflammation of the upper throat and windpipe, characterized by a whitish deposit or exudation upon it, called a false membrane.

Causes.—The occurrence of croup in calves is not frequent, and is confined to low lying districts on the banks of rivers, where they are exposed to damp chills and heavy dews. It is a disease of early life, appearing in calves from a few weeks to three months old, and rarely occurs except in the fall of the year.

Symptoms.—There are a hoarse cough, discharge of spittle from the mouth, and running from the nose. The animal does not thrive, swallows with an effort, and in drawing in its breath a whistling or crowing noise is heard.

As the disease progresses the breathing becomes more labored, the cough is more violent and in paroxysms, and shreds of false membrane are coughed up.

Treatment.—A moderate purge at the outset will be found of use, and small doses of saltpetre in the drinking water, to allay the feverish symptoms. To relieve the throat of the false membrane, it will be of benefit for the calf to inhale the vapor from slacking lime (taking care that it is not too concentrated).

THE HUSK OR HOOSE—PARASITIC BRONCHITIS.

Definition.—A disease caused by the irritation in the windpipe, bronchial tubes and lungs, of a parasitic worm called the *Strongylus*. The disease is very fatal to sheep in many parts of this country, and will also be considered under their diseases.

Cause.—These worms generally attack calves under one year old, and especially such as are pastured in low-lying lands, near rivers, and subject to flood. They are mostly seen in the months of August and September. Sometimes they are very numerous, and are found after death congregated together in a ball in the windpipe, thus choking the animal to death.

Symptoms.—The complaint is marked by a hoarse, bronchial cough, called the "husk" or "hoose," loss of flesh, difficulty of breathing, and suffocation to a greater or less degree. Sometimes in the mucus coughed up the parasite may be detected. It is white in color, the body an inch or two long, and slender as a thread. Whenever in the autumn

months calves are noticed to cough and gasp, they should be carefully examined for the signs of this worm.

Treatment.—Affected calves should be separated from the rest of the flock, so that none of the eggs of the worm convey the disease to the remainder. They should be placed in a dry stable, protected from dampness, and caused to inhale two or three times a day the fumes of burning sulphur. If this is done for fifteen or twenty minutes at a time, and continued for two or three days, the worms will generally be destroyed.

The vapor of chloride of lime is also said to be destructive to them.

Or, instead of inhalations, a small dose of turpentine, about half an ounce, may be given in gruel daily, for a few days. Or a teaspoonful mixed with double the quantity of sweet oil may be poured into the nostrils. This is, however, liable to choke the patient if carelessly done. Two or three doses, at intervals of two or three days, will effect a cure. Or the turpentine may be given in the following tonic combination :—

No. 388.	Oil of turpentine,	½ oz.
	Carbonate of iron,	2 drachms.
	Gum mixture,	4 oz.

A tablespoonful to be given night and morning.

Or—

No. 389.	Linseed oil,	4 oz.
	Oil of turpentine,	1 oz.
	Oil of carraway seed,	20 drops.

Give half this dose morning and night, to a calf six months old, and repeat it in ten days.

Half a pint of lime water every morning will destroy the worms also ; but a teaspoonful or two of turpentine with it adds to its efficiency.

CHAPTER V.

DISEASES OF SHEEP.

General Remarks on Diseases of Sheep, and their Treatment.
Braxy—Striking of the Blood—Charbon in Sheep.
Sheep Smallpox—Variola Ovina.
Louping Ill—Thorter Ill—The Gnaw Disease.
Malignant Epizootic Catarrh—The Sheep Distemper.
Colic—Blown—Blast—Wind Dropsy.
Red Water—Hœmaturia.
Hoof Rot—Foot Rot.
Foul in the Foot.
Stone in the Bladder.
Lambing in the Ewe; Heaving Pains; Milk Fever; Garget.
Rheumatism of Lambs.
Constipation in Lambs.
Diarrhea in Lambs.
Turnsick—Sturdy—Gid—Hydatid of the Brain.
Sheep Bots—Grubs in the Head—Head Maggots.
Lung Worms—The Hoose in Lambs—White Skin—Paper Skin—Pelt Rot—The Pale Disease.
The Rot—The Liver Fluke.
Intestinal Worms.
The Scab—The Mange or Itch in Sheep.

GENERAL REMARKS ON DISEASES OF SHEEP, AND THEIR TREATMENT.

The two most prominent classes of the diseases of sheep are: 1. Those arising from exhaustion, debility, and a low state of the system; and 2d, Those arising from the presence of parasitic animals.

It has long been noticed that even in England and Scotland, inflammatory affections are rare in these animals, their

weak structure not resisting a violent attack but sinking beneath it. Hence their maladies are what physicians call of "a low type," and hence, also, bleeding, purgatives and depressing medicines, as aconite and tartar emetic, are very rarely indeed required in their medication. According to eminent sheep breeders in this country, these characteristics are yet more marked in our breeds. "The American sheep," says Col. Randall, "which has been kept in the common way, sinks from the outset or after a mere transient flash of inflammatory action; and in any stage of its maladies active depletion is likely to lead to fatal prostration."

Parasites are very common both on and in the sheep. Its thick wool and comparatively thin skin offer a most favorable lodging place and feeding ground for the class of vermin which dwell on the surface of the body. While of its internal organs, not only the stomach and bowels, but the liver, brain and nostrils are the chosen habitat of various lower forms of animal life.

The American sheep has up to the present been wholly or almost wholly exempt from a number of epidemic diseases and local affections which have decimated the English and continental flocks over and over again. The sheep-pox, so far as we are aware, has never appeared anywhere in the United States; malignant braxy or charbon, while of occasional occurence, has rarely developed into an epidemic, and then but locally; red water seems unknown; hydatid in the brain, or turnsick, although reported from New York and other States, is a curiosity rather than a scourge; and the true rot, caused by the liver fluke, has never assumed the proportions of a destructive malady, although the parasite that causes it is known in this country, especially on the Pacific coast.

Indeed, the mortality of sheep is remarkably low in most sections of the States which are occupied with wool growing. It has been estimated as low as two per cent. per

annum of the adult animal; but this is undoubtedly a much too favorable statement; eight or ten per cent., at least, of the total number of lambs born perish by disease.

Nevertheless, in the active interchange of stock between different parts of this country, and between this country and Europe, we are liable any season to have brought to us these much feared diseases in a malignant form; therefore we have taken brief descriptions of them from the most eminent foreign writers, with the treatment they recommend.

BRAXY—STRIKING OF BLOOD—CHARBON IN SHEEP.

Definition.—A disease of the blood, identical with charbon, or malignant anthrax, in cattle (see page 276); occasionally epidemic, at other times confined to definite localities and herds. It is also known by the names of "St. Anthony's fire," "carbuncular erysipelas," "the blood disease," etc.

Causes.—A very careful study of the causes of braxy in Scotland and the sheep growing districts has led to connect its appearance with over-feeding on too rich or unhealthy food, and exposure to sudden changes of weather.

Thus it is most common at those seasons when the pasture is most rank, and among herds on loose, damp bottom lands, occasionally overflowed, and sending up a succulent, sappy growth of grass; also where the vegetation is subject to mildew or blight; where overfeeding on grain and clover hay, with deficient exercise, has been carried on for some time; where with full feeding the cotes and stables have been kept quite warm; and finally, on exposed sheep walks, where the animal is exposed with little protection to sudden changes of temperature. The last mentioned is so well known that in bleak walks in the Scotch Highlands, after an unexpected snow blast in the autumn, the shepherd looks to have some of his flock struck by the braxy, as a quite regular event.

In the study of its prevention, therefore, owners should choose pasturages with good drainage, and of moderate growth, and avoid, in their desire to fatten and strengthen, a stimulating diet, which may result in developing germs of poison in the blood.

Symptoms.—The sheep is affected by charbonous fever in two forms, which by the uneducated are supposed to be distinct diseases; in fact, they have been so spoken of in quite recent works on diseases of these animals. The first and most rapidly fatal form is

Splenic Apoplexy.—The attack is very sudden, the animal ceasing to eat; the body suddenly shivering, as if struck with a chill; there is staggering or reeling, and an effort to stand by putting the feet well asunder, which may fail, and the body falls. The breath is rapid, the eyes are red, the teeth grate together, and loss of sensibility is common. The lining membrane of the mouth is injected with blood of a dull red color; the dung is passed without effort, and the urine is colored with blood. A bloody froth issues from the mouth and nose; the animal is seized with convulsions, in which he throws his legs about and bends his head and neck backward; there is a rattling in his throat, and he expires.

Such a rapid, apoplectic form of the disease is more common in young sheep and those very richly fed. The other and slower variety is that seen in older animals, and those of a less plethoric condition. This is more properly a

Charbonous Fever.—The first symptom in this form is that the animal walks with a shorter step than usual, caused by pain in the bowels; soon he begins to lie down and rise up frequently, or stands apart with head hanging and back arched. The eyes are dull, or bloodshot, the belly swollen, and the ears droop. Often upon several places on the skin, especially of those parts which are but lightly covered with

wool, angry-looking red or purple spots appear, like blotches, not disappearing on pressure, and rapidly increasing in size and number. These swell, and upon their surface blisters, filled with a watery or bloody fluid, appear.

A penetrating and offensive odor exhales from the animal, bloody serum appears at his mouth, nose, eyes and anus; and ere long he is seized with convulsions, or passes into a state of stupor and perishes. It is seldom that the disease lasts three days, often but ten or twelve hours.

After death the blood remains quite fluid, the body decomposes rapidly, and the odor is distinct from that of ordinary decomposition. The flesh and inner surface of the skin is bluish red, and stained with patches of dark, bloody accumulations.

The disease, both before and after death, is so strongly marked that it is easy to recognize it, especially as it is the rule that several, or a large percentage of a herd, are attacked with it when it appears at all.

Treatment.—This is essentially the same as that recommended in the charbon of cattle (page 278). The chlorate of potash is one of the most reliable of antidotes to the poison, when it can be given with promptness.

Some believe that a brisk purge given at the outset will relieve the condition of the blood, as—

No. 390.	Sulphate of magnesia,	2 oz.
	Warm water,	1 pt.

For a drench.

Or,

No. 391.	Castor oil,	3 oz.
	Calomel,	12 grains.
	Molasses,	3 oz.

Mix for a dose.

As a preventive, a seton, no doubt, is advantageous in plethoric sheep, as a derivative. Mr. H. Clok recommends

the following as a very efficient "lick," to prevent the disease from spreading through a herd :—

No. 392. Nitrate of potash,
Sulphate of magnesia,
Ground calamus,
Laurel leaves,
Juniper berries, of each, 2 lbs.
Golden sulphuret of antimony, 1 lb.

Mix well with the food, clover preferred, and give one-quarter night and morning, for two days.

This amount is enough for one hundred sheep. The same author urges that great care be observed in regard to feeding, so that the change from stable-feeding to pasture-feeding is only to be allowed by degrees. In the morning the sheep must not be driven to pasture until the dew and moisture have entirely disappeared from the meadow, which depends upon the temperature and weather. At noon a shady and cool resting-place must be provided.

Another preservative, as well as preventive, consists in the application of cold shower-baths, which may be applied to the herd by means of a squirting engine, the nozzle of which is provided with a sieve, or by means of a garden-spout; the cold water to be applied at different times of the day, and until the animals are perfectly cooled. The herd may also be driven into cold or refreshing streams; in case of rain the herd must be allowed to remain exposed to it at their pleasure.

There appears to be a hereditary disposition to this disease; it may therefore be presumed that in case of an extraordinarily frequent occurrence among certain herds, the sale of such sheep and the purchase of other stock will prove the most profitable.

SHEEP SMALLPOX—VARIOLA OVINA.

Definition.—A contagious eruptive fever depending upon a specific poison, corresponding in character to that which produces smallpox in the human race.

Causes.—The ravages which smallpox in the sheep has caused fully equal those which the analogous disease inflicted on the human race in the last century. It does not appear to be mutually contagious, however. The sheep pox, though common on the continent of Europe for one hundred and fifty years previous to 1847, did not reach England until that year, and has, we believe, not yet made its appearance in this country, though in the importation of sheep, hides and wool, we are never secure from its introduction.

The mortality in England has occasionally reached one-third of the flock in a single outbreak; and in Austria and Hungary the losses are said to foot up from four to five hundred thousand sheep in some years. It is, therefore, a scourge much to be dreaded.

Symptoms.—Sheep pox shows itself in two forms, one malignant, the other mild.

The malignant form is not accompanied with an eruption of pustules on the skin. There are some scarlet or purple points, but they do not maturate or form pus. The animal ceases to eat, moves unwillingly, his head is swollen, the eyes closed and often inflame and ooze out; the wool falls off, the skin cracks in a zig-zag manner, and the nostrils become filled with a fetid discharge. The animal suffers extremely from thirst, but cannot drink, or with difficulty, on account of the inflammation of the lips. Death generally occurs in from two to three weeks from the outset of the disease.

In the milder form the eruption first shows itself in a diffused redness, or in a number of minute red spots like flea bites, on that portion of the skin least covered with wool.

These spots increase in size and run together, becoming elevated in the centre, where in a few days a small blister or vesicle appears, containing a liquid at first like a drop of water, later turbid and like pus. This is the smallpox vesicle, which in the sheep, however, remains flat on the surface, and does not become hollowed or "umbilicated," as it does in the cow and in man. In the fourth week of the disease these vesicles dry up, and form scales. When these fall off a bare spot is left which is never after filled with wool or hair.

With these local symptoms there are others of constitutional disturbance. The animal wanders away from the flock, loses appetite, licks the earth, is thirsty and feeble. The eyes are bloodshot, the breathing labored and the general condition one of fever of more or less severity according to the violence of the attack.

Treatment.—The treatment of the disease has been very unsuccessful, and consequently the more attention has been given to its prevention. This has been attempted in two directions by *isolation*, and by *ovination*, as the operation of vaccination is called when applied to sheep.

Professor Gamgee relies entirely on isolation. He advises that the diseased be separated to a long distance from the healthy animals during the earliest stages of the malady; and that disinfectants be freely and liberally used, both on the sick and the well. He has no confidence in inoculation or ovination, believing that it rather disseminates than checks the malady.

On the other hand, the French and German veterinarians are nearly unanimous in favor of ovination; and if we can rely on the statistics they furnish, we cannot doubt but that it has succeeded most satisfactorily in staying the progress of the disease—quite as much so as in the human race. In many countries of Europe, especially in Austria, growing

lambs are regularly vaccinated in the spring, when from three to four months old, the general result being a very considerable diminution of deaths from the disease.

The sheep lymph used for inoculation is obtained from separate (discrete) vesicles, on the sixth or seventh day of the eruption. It should be perfectly clear and fluid, like water. The animal from which it is taken should be otherwise healthy, free from rot and scab, and if possible one who has been vaccinated previously, or at all events has the disease in a mild form. The lymph is to be preserved in the same manner as that used for vaccination in man.

The most suitable place for inserting the lymph in the sheep is on the *inner side of the ear*, this spot being both convenient to the operator to reach and less liable than most to be injured by the scratching of the animal when the pustule begins to itch. There is no special manner of applying the lymph; the general rules adopted for this simple operation in children, answer as well for the sheep.

It is needless to undertake vaccinating a flock unless the pox is actually in the neighborhood; and then it should be done promptly, and repeated until every sheep has had the lymph "take" on him fairly. Even when the disease has already attacked an animal, vaccination should be performed, as it often renders the course of the malady much milder.

LOUPING ILL—THE GNAW DISEASE—THORTER ILL.

Definition.—The disease called by these uncouth names is an affection of the spinal cord, common in lambs and young sheep, but rare after the third year. It is accompanied by organic changes in the cord, either of hardening or softening, or with watery secretion. It corresponds closely to that disease in man known as "myelitis, with sclerosis or ramollisement of the cord," both in symptoms and appearance of the cord after death.

Causes.—The disease is undoubtedly hereditary, and it is attributed to a naturally defective organization in some herds. Where it prevails, it is prudent, therefore, to change the breed.

Symptoms.—One of the first symptoms is a slight weakness in the hind quarters, indicated by the animal taking broader and shorter steps, "louping," or loping in its run. It is, moreover, unable to jump, and if it attempts to do so will fall on its fore feet, or quite on the ground. If it undertakes to run, it will fall frequently and rise with difficulty, staggering and trembling.

Many such patients, apparently sensible of some change in the sensation of the hind quarters, will gnaw or bite at their thighs, pulling the wool out, and sometimes biting to the blood and making a scab. This habit also gives one of the names to the disease by which it is known in some parts of the United States.

As the disease advances the animal grows stupid, the ears loll loosely down, and the palsy, which was at first confined to the hind quarters, extends and becomes more decided. The appetite, which at first was not affected, is diminished, flesh is lost, and general debility and emaciation wear out the patient.

The duration of the disease is from two to three months; as a rule it terminates in death; but cases are not rare where the symptoms disappear after a few weeks, and the animal resumes its natural vigor.

Treatment.—This should be directed to active stimulation of the spine and the nervous system.

The wool should be clipped close along the backbone, over the loins, and the part rubbed with a stimulating ointment or liniment, such as Nos. 235, 239. A moderate degree

of irritation should be maintained constantly. Internally the animal should have—

No. 393.	Powdered nux vomica,	1 oz.
	Water,	1 pt.

Rub up together, and give a spoonful daily.

Exposure should be avoided, and the animal should not be urged to exercise, but allowed to rest.

MALIGNANT EPIZOOTIC CATARRH—THE SHEEP DISTEMPER.

Definition.—An epidemic affection, occurring chiefly in the late winter and early spring, accompanied by severe congestion and inflammation of the lining membrane of the nasal cavities, and occasionally of its prolongation into the stomach and bowels, producing symptoms of catarrh, or, in the second case, of catarrh and gastro-enteritis.

Causes.—As in most of the epizootic diseases, the cause is unknown. It generally prevails at the close of wet, open winters, with rapid changes of temperature, and in flocks which have been confined in ill-ventilated stables. But it is also not uncommon where no such condition prevails.

The periodical recurrences of this disease have proved very fatal to American sheep, and even yet, according to Col. Randall, it "continues to destroy more American sheep than all other maladies combined." Sometimes forty or fifty per cent. of the flock succumb to it.

Symptoms.—The disease commences with depression, and a slight watery discharge from the nostrils and from the eyes, which are partly closed and paler than natural. The animal is dull and drooping, its movements languid, and more or less loss of appetite is manifest. The pulse is not altered in frequency, or but slightly so, but is weaker than usual. There is no cough, and the breathing is not affected, except where the disease is associated with bronchitis.

The symptoms mentioned slowly increase in severity until, in about a week, there are evident emaciation and great prostration. The nasal discharge is thick and glutinous, sometimes tinged with blood; the eyes are half closed, and the lids matted by a yellow secretion. The appetite has almost gone, and the pulse scarcely perceptible. The respiration is labored and difficult. In well-fed sheep the bowels continue natural, as a rule; but in those on insufficient or poor diet the bowels may become inflamed and swollen, and dysenteric symptoms arise. The excrement is voided with pain, and it is mixed with blood. The attack usually commences with constipation. The average length of the disease is ten to fifteen days.

After death, the principal and characteristic lesion is a highly inflammatory, thickened and congested appearance of the lining membrane of the nostrils and nasal cavities throughout, sometimes passing into ulceration. This condition may extend, with more or less intensity, to the mucous membrane of the upper throat and gullet; and more rarely down the latter, and to the bowels.

Treatment.—It must be acknowledged that no plan of treatment has been tried with very satisfactory results. Certain rules are, however, of considerable value. No bleeding, purging or depressants must be used. Concentrated and nourishing food and stimulants are demanded from the outset. A dry and equable temperature is important.

In regard to medicines, Col. Randall believes that he has derived advantage from the use of *corrosive sublimate*, in small and repeated doses, providing that it is commenced early in the disease. He combines it as follows:—

No. 394.	Corrosive sublimate,	8 grains.
	Rhubarb,	1 oz.
	Ginger,	
	Gentian, of each	2 oz.

Simmer the last three articles in a quart of water, for fifteen minutes, strain, and add the sublimate. The dose is two tablespoonfuls, twice a day.

COLIC—BLOWN—BLAST—WIND DROPSY.

Definition.—By these names is known the swelling of the third stomach in sheep, by food and air, or gases. It is the disease which in cattle is called *hoven* (page 291).

Causes.—The most frequent cause is feeding on green clover, or other strong grass, wet with rain or dew. Musty and ergoted food, such as on stubble fields and blighted corn, are other provocatives of the disease; and occasionally it arises from a constitutional difficulty in digestion.

Symptoms.—The disease is readily recognized by a swelling of the belly on the left side, which appears while the animal is feeding, or shortly afterward. The breathing becomes oppressed, the bowels are constipated, the eye anxious and wild; there is every symptom of intense pain.

Some say that in sheep, so long as the swelling is on the left side only, there is no danger; but when the right side partakes of the distention also, it is a sign that the walls of the rumen are expanded to the utmost and are in imminent danger of rupture.

Treatment.—When the distention is great, no time must be lost in removing the wool from the most prominent part of the swelling, and plunging a trocar into the rumen, to allow the air to escape. When a trocar is not at hand, a sharp-pointed penknife should be used, the edges of the opening being kept apart by inserting a goose quill with a collar of leather, or some similar hollow tube.

When the case is not so severe as this, stimulants and aromatics are the medicines demanded, as:—

No. 395.	Ground mustard,	1 drachm.
	Whisky,	1 oz.

Mix and give in a small quantity of water. Repeat as needed.

No. 396.	Solution of potash,		2 drachms.
	Common salt,		
	Sweet oil,	each,	1 oz.

Mix in a wineglass full of water.

Mechanical means are often employed successfully to aid these remedies, or independent of them. The swollen stomach is pressed and kneaded with the hands, which urges the gas up the gullet. Or the sheep is plunged into cold water, which brings on relaxation of the gullet and the gas escapes. Or a rubber tube of half-inch calibre, furnished with a button of wool at the end, to prevent clogging, is thoroughly oiled, and introduced gently into the gullet and passed down to the stomach. This will often cause the escape of air in large quantity and, give immediate relief. Such a tube has various uses, and one should be about every large fold.

RED WATER—HÆMATURIA.

The name "red water" is sometimes applied to a form of dropsy, where the water accumulated in the abdomen is of a reddish color; but it should be confined to a disease, not infrequent in various localities, characterized by a red color of the urine due to the presence of red blood coloring matter in it. It is probably acute nephritis.

Causes.—These are exposure to cold and wet; lying down on cold, marshy ground; and in general, chilling from change of temperature. Well housed sheep rarely suffer from it.

Symptoms.—The attack commences with diarrhea, of a dysenteric character, continued scouring, sometimes of bloody matter, and the passage of pink, red or dark urine. The animal is weak, and the belly swollen. If it is a ewe, the secretion of milk is suspended. The head is protruded or hanging, the breathing labored and panting. As the

disease advances, palsy of the hind quarters, supervenes and the sheep rises up with difficulty, or not at all.

Treatment.—The animal should at once be brought in the house and well protected from wet and cold. Its loins and belly should be mopped with hot mustard water and covered with a rubber cloth, to keep the heat in. Internally it should take—

No. 397.	Oil of turpentine,	½ oz.
	Linseed oil,	1½ oz.

Mix for a dose.

The diet should be nourishing and stimulating; as, for instance, oat-meal gruel, made with cow's milk, and containing a spoonful of powdered ginger or essence of ginger. With this treatment, recovery is pretty sure to take place.

HOOF ROT—FOOT ROT.

This is one of the most common diseases of American sheep, and with which every sheep owner in all parts of our land is pretty certain to become familiar at some period of his experience.

Causes.—As to its cause, there can be no doubt but that it is generally contagion—always contagion, many observant breeders say. Others assert that it can be developed spontaneously by pasturing in rank, lush grass, on damp meadows, and in boggy fields. They perhaps confound it with foul in the foot, which is a comparatively trifling and temporary affection.

Symptoms.—The descriptions of this disease as it appears in various prominent English works, notably those of Mr. Youatt, are misleading and inapplicable to the American form of it, especially in its earlier stages. We shall therefore rather depend on the descriptions of Col. Randall and

Mr. Clok, both of whom have observed it extensively in various parts of the United States.

The first symptom is the disappearance of the naturally smooth, dry, pale condition of the skin at the top of the cleft, over the heels. It becomes somewhat red, warm and moist, and slightly rough or chafed. Next, the moisture increases to a discharge, and an ulcer is formed which extends down to the upper portion of the inner wall of the hoof. These walls are then attacked, become disorganized, and the disease penetrates between the fleshy sole and the bottom of the hoof. The hoof is thickened at the heel, by an unnatural deposition of horn. The crack between it and the fleshy sole pours out an offensive and purulent matter. Soon all parts of the foot are penetrated by the burrowing ulceration, the horny sole is disorganized, and the fleshy sole becomes a black and swollen mass of corruption, shapeless, spongy, and often filled with maggots.

The fore feet are usually first attacked; lameness is early noticed and soon becomes complete; general fever comes on late; the appetite is lost, and the animal dies from exhaustion.

The offensive odor of the true foot rot is characteristic, and once made familiar will serve as a certain guide in recognizing the disease. The disease may present itself in a malignant and rapid form, or in a mild one. Its first attack on a flock is generally of the severer character. When it is kept under the first year, its appearance the next summer will be mild; and the third season still milder.

Treatment.—While it is evident from the above description that foot rot is a dangerous, disgusting and painful disease, we have the satisfaction of adding that with proper treatment and sufficient care, it is always curable. In fact, no disease of the sheep yields more certainly to remedies properly used. And if, as often happens, the farmer finds

his sheep still limping and hobbling after he has, as he thinks, given them proper attention, it is because he has been ignorant of what the case demands.

The most important, the absolutely indispensable part of the treatment is, the preparation of the hoof, by *cutting away every particle of the diseased structure.* No remedy will succeed if this is neglected; almost any one of the dozens recommended will be satisfactory if this is well done.

The sheep should first have their feet cleaned, by grazing a day or two in a short, dry pasture; or by being driven through a gravelly brook, when this is practicable. As for the operation itself, Mr. Clok gives the following directions, which are none too minute:—

The operator provides himself with a strong and sharp, but narrow-bladed knife. He seats himself, and has an assistant turn the sheep on its back, and open the cleft of the hoof. He then begins at the suture and cuts out all horn which has separated from the foot and is suffused with matter. The inner sides of the horny capsule deserve special attention, as do also the parts where the horn appears whiter and softer than on the other parts of the hoof. The knife must be freely used, and all loose horn removed up to the point whete the connection remains unimpaired. The bleeding which may occur is wholly without danger.

A knowledge of the anatomy of the sheep's hoof will prevent the abuse of the knife. It is proper, in all cases, to pare down the sick hoof considerably at the toe and external wall, because it can then be more easily examined, and it does not touch the ground so forcibly when the animal is walking as when it is larger than the healthy one. The knife must be cleaned from time to time, so that the matter adhering to it does not infect the healthy parts.

If the disease is further advanced, and the secretion has collected far down in the hoof, the same operation is per-

formed; and it will sometimes be necessary to remove the whole capsule. Every hidden channel which may be present should be sounded, opened and laid bare. If the wound becomes covered with blood during the operation, as is commonly the case, it should be frequently dried with tow. If a single diseased place remain from which the horn is not removed, a cure cannot be expected. After cutting away the whole or a part of the horny capsule, it is always necessary to apply a bandage to protect the hoof from dangerous external irritation.

The foot thus thoroughly prepared, the next step is to apply a caustic. Of these, very many have been suggested. Colonel Randall prefers to everything else a hot saturated solution of *sulphate of copper* (common blue vitriol). He fills a large, shallow tank with water, to the depth of four inches, and has each sheep stand ten minutes in it, or, in bad cases, longer. The solution is kept as hot as the hand can bear it, by the addition of boiling water, saturated with the vitriol. This he extols as the most certain, the easiest and the cheapest remedy he has ever tried.

For the same reasons Mr. Clok praises *chloride of lime* (common bleaching powder). After paring the foot, he covers it with the chloride, and fills the cleft with a piece of tow, whose ends are twisted into a small cord and fastened around the pastern joint. This forms a soft and tightly fitting bandage. The hoofs are inspected daily for some time, and the chloride renewed if necessary. Two or three applications may be required. In malignant cases, before applying the chloride, he would bathe the parts with—

No. 398.	Creasote,	1 part.
	Alcohol,	4 parts.

For a foot wash.

Of the many other applications popular in rot, we give some examples, premising with the remark that any one of

them is useful if the foot is well prepared, and no one of them is worth much otherwise.

One quite popular in central New York is—

No. 399.	Sulphate of copper (blue vitriol),	1 lb.
	Acetate of copper (verdigris),	½ lb.
	Linseed oil,	1 pint.
	Tar,	1 quart.

Rub the vitriol and verdigris in very fine powder, with the oil, then add the tar and mix thoroughly.

Mr. Finlay Dun speaks well of the following:—

No. 400.	Powdered sulphate of copper,	1 part.
	Tar,	3 parts.

Mix well over a slow fire.

And—

No. 401.	Oil of turpentine,	1 part.
	Sweet oil,	3 parts.

Used in tedious cases of foot rot.

Carbolic acid in 5 or 6 per cent. solution, nitrate of silver, chloride of zinc, and in fact almost any of the caustics answer well.

Whatever preparation is used, the sheep should be kept in a dry, well-littered shed, or on a short, dry pasture for a day or two after the application, as if they are at once turned into a field covered with wet and high grass, it is obvious that the caustic will in great part be washed from the foot.

The foot rot is essentially a local disease; but in severe cases it is advised to give internally a tonic, such as—

No. 402.	Common salt,	1 to 2 drachms.
	Sulphate of iron.	
	Nitrate of potash, of each	½ drachms.

Make into a powder, to be given daily.

When the rot appears in its most malignant form, and the case is a very bad one, many veterinarians claim that no remedy is equal to *butter of antimony* (solution of terchloride of antimony). It is an energetic caustic, and must be employed cautiously. As it cannot be diluted with water

without undergoing decomposition, it should be mixed with an equal quantity of compound tincture of myrrh. Prof. Williams states that for general use in the disease he has found it as effectual, and much less painful to the animal than any other. The sulphate of copper he thinks suitable for mild cases.

As a *preventive* of foot rot, nothing is so effective as a solution of *arsenic*, used in the following manner:—

No. 403.	Arsenic,	
	Washing soda, of each	2 lb.
	Water,	10 gallons.

Boil slowly to eight gallons, and fill up to ten.

With this, the hoofs of the sheep are thoroughly sponged after cleaning; or the animal is obliged to stand for a minute or two in a tub or shallow trough containing it. Some of the largest Scotch breeders use this occasionally during the summer and fall, and as a consequence foot rot is unknown in their flocks.

FOUL IN THE FOOT.

Although sheep are much less subject to this disease than cattle, they will contract it if kept in wet and filthy yards, or on moist, boggy pastures. They are also prone to it in wet seasons, from walking in the tall, dripping grass.

The skin in the cleft of the foot has a macerated or water-soaked appearance, accompanied by slight inflammation, passing into ulceration, and bringing on lameness. Often at this stage it is mistaken for hoof rot.

The treatment of the disease is simple, as it will generally disappear of itself if the flock is turned on dry, short, upland pastures, or kept in a clean, well-littered yard. Further than this, it is well to wash and otherwise clean the feet, and paint them with a mixture of one part powdered blue vitriol

rubbed up with five or six parts of tar; or other simple stimulant and cleansing preparation.

STONE IN THE BLADDER.

Male sheep, both rams and wethers, especially when highly fed, are subject to the formation of stones in the bladder. These stones are not of carbonate of lime, as those in the horse and ox (see page 161), but like those occasionally found in the pig, consist of the ammonio-phosphate of magnesia.

Their presence is attributed to high feeding, or to feeding on some special article of diet, especially oil cake and turnips, both these foods being rich in the chemical substances which make up the stone.

The symptoms are difficulty and pain in passing water, straining, and sometimes bloody urine.

Treatment.—It is possible to operate successfully for stone in the bladder in sheep; but unless the animal is valuable, it is not worth while to undertake treatment.

In costly rams, kept for breeding purposes, after the stone is removed, the treatment recommended by an English writer, Mr. Litt, may be undertaken with a fair prospect of preventing any further return or increase of the trouble. He begins with a dose as follows :—

No. 404.	Castor oil,	6 to 8 oz.
	Extract of belladonna,	8 to 16 grains.

Mix for one dose.

After this has acted he puts the ram on doses of bicarbonate of potash, thirty to sixty grains, repeated thrice daily, freely diluted with water. The bowels are kept open by laxative food, and the animal is given plenty of exercise

LAMBING IN THE EWE.

Northern farmers aim to have their lambs yeaned in April and the first weeks of May. In the Merina and Saxon breeds this act generally takes place without impediment; but in high-kept English ewes, difficult positions of the lamb occasionally require the shepherd's assistance.

The natural position of the lamb in leaving the womb is with the nose first, and the fore feet on each side of it. But the lamb can be born without much delay which presents with both hind feet and the rump.

The general methods of relief are the same in false presentations as have been described in the cow, (page 320). The broad rules are, when the lamb presents unnaturally, to push it back into the womb; when force is applied to withdraw it, be sure that it is exerted in the line of the vagina, and simultaneously with the labor pains, the operator resting when they pass off; and the exercise of traction in a gentle and steady, not in a jerking manner.

When the pains are deficient, they can be stimulated with ergot, as—

No. 405.	Powdered ergot, Powdered ginger, of each	30 grains.

For one dose.

When the pains are excessive and exhausting, the following is recommended, to render them regular and keep up the strength:—

No. 406.	Spirits of camphor,	1 drachm.
	Laudanum,	½ oz.

Give in some gruel.

As in cows (see page 323), so in ewes, the womb is liable to become inverted and hang, like a bag, from the vagina. The treatment is substantially the same. It should be well washed with alum water, carefully returned, and retained either by a bandage, or by taking a single strong stitch

through the lips of the vagina. If this fails to effect a cure, and the falling of the womb becomes habitual, it should be strongly corded close to the vagina and allowed to slough off.

Milk Fever in Ewes.

Puerperal fever or *milk fever* is not common among ewes, at least in the United States. It more generally affects middle-aged ewes and those carrying twins; those which are highly fed and plethoric are special subjects for its attacks.

The early symptoms are, loss of appetite; twitching of the hind legs and ears; dullness and weakness; staggering; and the discharge of a dark-colored and offensively smelling fluid from the vagina. The time of attack is generally a few days before the expected yeaning time, and the fetus is nearly always discharged dead, and often putrid.

The treatment recommended by an experienced New York sheep raiser is as follows:—

Separate the sick ewe at once from the flock, and give her

No. 407.	Sulphate of magnesia,	2 to 3 oz.
	Nitrate of potash,	1 drachm.
	Molasses,	3 oz.

Give in a pint of warm linseed gruel.

Should this not open the bowels in eight or ten hours, it should be repeated. After that the nitre and molasses are continued, without the salts, as long as there is fever. If the period of yeaning is at hand, as is generally the case, a little extract of belladonna is to be put on the end of the finger, and placed on the mouth of the womb. This, repeated hourly, will soon cause relaxation and discharge of the contents. The womb should then be thoroughly syringed out with warm water and milk, dilute lime water, or a warm, weak solution of chloride of lime or carbolic acid (1 or 2 per cent.). The ewe's position is made as comfortable as possi-

ble, and always changed twice a day. Tonics and nutritious food are called for, to hasten the return to health.

As a preventive, a small quantity of grain, say half a pint per head, for two months before lambing, is generally efficient.

If constipation persists after lambing or abortion, Prof. Gamgee recommends that the ewe be given—

No. 408.	Sulphate of magnesia,	½ oz.
	Laudanum,	1 drachm.
	Powdered camphor,	½ drachm.

Mix in gruel, for one dose.

Garget in Ewes.

The symptoms of this are enlargement of the udder, which is hot and tender to the touch and has a dense, fleshy feeling. Sometimes it is so sensitive that the ewe refuses the lamb. In the more severe type, what is termed "black garget," there is a dark-colored spot or spots of mortification on the udder, which break, forming ugly and intractable ulcers. The ewe is lame, and often suffers from chills and shivering.

The treatment must be prompt. The udder must be thoroughly fomented with a sheepskin dipped in hot salt water, and if the inflammation is high, the udder hot, and the swelling extending upward, blood must be drawn, to the extent of half a pint, from the large vein which runs under the belly. Internally the ewe should have

No. 409.	Sulphate of magnesia,	4 oz.
	Powdered ginger,	1 oz.
	Oil of turpentine,	½ oz.

Mix for one dose.

If these measures do not reduce the swelling, as soon as matter forms, and can be detected by a fluctuating feeling imparted to the finger, the spot must be lanced freely, the pus turned out, and the cavity thoroughly syringed with strong salt water.

In mild cases we may omit the turpentine from the above and give—

No. 410.	Sulphate of magnesia,	3 oz.
	Flowers of sulphur,	1 oz.

Mix in gruel.

The lamb should be put to the teat as often, and as soon, as practicable.

RHEUMATISM OF LAMBS.

A disease which has occasionally been spoken of as identical with the one described as Louping Ill, and regarded as a species of "palsy," is simply acute rheumatism as it manifests itself in young lambs, within the first few weeks of their lives.

Symptoms.—The symptoms are not always the same. The first is generally a stiffness of one or more legs. Walking is obviously difficult, and the motion of the limbs unnatural and clumsy. This stiffness extends to the other joints, especially to the neck, which is cramped, and unwillingly moved. The animal is listless, depressed, and remains in one position. The bowels become obstinately constipated, and the belly lean and tucked up.

Usually the joints swell and become painful, the swelling being hot and tender to the touch. After death these enlargements are found to be due to inflammation of the cartilages and lining membranes of the joints, presenting the usual appearance of acute articular rheumatism.

The disease generally lasts from one to two weeks, but death may occur sooner; and when recovery does take place it is generally slow, requiring three or four weeks, with a liability to relapses.

Treatment.—It is the opinion among intelligent breeders that this malady is frequently, perhaps generally brought on

by injudicious feeding of the ewe during her period of gestation, thus vitiating the blood of the lamb, and rendering it unable to withstand the changes of temperature to which it is exposed. Thus it is stated by Mr. Clok that if the diet of the ewe during the last months of pregnancy consists of much clover, hay, potatoes, grain, and drinks of groats, the lambs are very prone to palsy soon after birth. Mouldy food of all kinds, mouldy oil cakes, rotten carrots, potatoes, etc., as well as putrid water, are very injurious.

The injurious influence of vitiated food in producing this rheumatic disease in lambs has not only been proved by numerous accidental observations, but is shown beyond a doubt by interesting and striking direct experiments. The fact that the milk of the mother exercises great influence in the production of the disease is proved by the experiment of allowing healthy lambs to suck the milk of a ewe whose young perished in this way. This experiment has been tried repeatedly, and the lambs were always affected with the disease. The fact is therefore beyond a doubt.

Not only vitiated or improper food causes the milk of the mother to become injurious, but also a diseased condition of the ewe, especially if she be affected with the fluke and rot. In lambs, catching cold is a source of the disease, which is the more certainly produced if the above-mentioned predisposition exists. It cannot, however, be stated with certainty whether catching cold is necessary, or whether the disease may be produced without, nor has it been ascertained if it can arise solely from catching cold without the presence of a predisposition for the disease or of other circumstances. Both are probable, however. It is most common during the wet, cold days of March and April and during bad weather, especially when the sheep are kept in warm, narrow and close stables. It appears particularly in weak, thin-wooled lambs

whose development is retarded, probably because they are most sensitive to cold.

Besides securing a proper diet for the ewes, the lambs, which are constipated, should have a preventive medical treatment, by giving them a warm laxative drench, such as

No. 410.	Sulphate of magnesia,	2 oz.
	Powdered carraway or ginger,	¼ oz.

Mix in a half pint of thin gruel, and give a wineglassful, warm, to a lamb two weeks old.

In the beginning of the mild forms of the disease Mr. Clok, says the following is a certain remedy:

No. 411.	Sulphuretted antimony, powdered,	5 parts.
	Fresh butter,	1 part.

Mix, and give a piece the size of a hazel nut, three times a day.

Or the following:

No. 412.	Sal ammoniac,	1 oz.
	Sulphate of soda,	2 oz.
	Essence of ginger,	1 drachm.

Mix in a quart of water, and give a teaspoonful several times a day.

The use of a strong decoction of willow bark, sweetened with molasses, and given in spoonful doses, often repeated, promises well in such cases.

The local treatment should be by soothing and sedative liniments, as of oil and laudanum, or soap liniment, with hot fomentations. The swellings should not be irritated with stimulating liniments, and still less, opened, as some ignorant persons have occasionally done.

Baths are efficient agents in aiding the cure. Some prefer cold baths at 50° Fahrenheit, in order to reduce the febrile symptoms. But better results will be obtained by warm baths at 95° to 100° Fah., in which some salt and mustard are dissolved. In this the lamb should be soaked for a half hour or hour, when it can be dried, wrapped in a woolen blanket, and placed in a warm corner.

CONSTIPATION IN LAMBS.

Lambs, especially those which are fed artificially, either on cow's milk or the milk of other ewes, are liable to constipation. The bowels ceasing to act, the animal droops, and lies down most of the time. Its belly becomes distended, the urine becomes scanty or almost suspended, the brain is oppressed, a stupor supervenes, and if not speedily relieved, the animal dies.

The treatment in such cases may be by medicines which act on the bowels, or by injections into the rectum, or by both combined. Two or three spoonfuls of melted lard, or one spoonful of castor oil are suitable internally. But the most reliable treatment is to give the lamb an injection of *warm milk*, about the temperature of the body, colored to a light brown by molasses stirred in it, two or three ounces of which are to be administered with a small syringe. To give this properly, the lamb should be held up perpendicularly by the hind legs, so that the fore feet but just touch the floor, during and for a moment after the injection. If hardened dung is not discharged with the fluid, or soon afterward, the injection is to be repeated.

If after the medicine has operated the lamb continues inactive and dull, it requires a tonic, as some spoonfuls of strong boneset tea (*Eupatorium perfoliatum*), or this, recommended by Prof. Gamgee:—

No. 413.	Golden sulphur of antimony,	½ drachm.
	Common salt,	1 drachm.

For a dose, once daily.

DIARRHEA IN LAMBS.

Diarrhea, which frequently attacks whole herds on first feeding on green grass, is usually of no danger; and when in individual cases simple diarrhea calls for attention, it

should be treated on the same principles and with the same remedies previously recommended for calves (see page 337).

But in sucking lambs diarrhea is often a very fatal disease, and must receive the closest attention of the shepherd, in order to rescue the patient.

Causes.—These are chiefly exposure to cold, sudden changes of temperature, as a hot stable in winter, and the drafts and bad air it involves, and improper diet. Cold drinks and a plethoric condition of the ewe are other causes.

Symptoms.—These are well described by Mr. Clok, as follows: The disease appears without warning; the lamb becomes languid and sad, keeps away from the other lambs, stands with bent back, or lies down frequently. The excrement, which is repeatedly discharged, is thin, whitish or greenish, afterward watery and mixed with mucus, and finally bloody. The animal ceases to suck and eat, but is very thirsty. It bleats frequently, evinces signs of pain if pressure is applied to its belly, and makes efforts to discharge excrement. The lamb rapidly loses flesh, its belly sinks in, and death ensues between the second and fifth days, and sometimes even on the first day.

If the body is opened, the rennet-bag especially, and a large portion of the intestines, are found to be inflamed. The rennet-bag and the intestines, particularly the inflamed parts, contain a substance looking like cheese or curdled milk. The best sheep are most liable to the disease, but if it appears as a plague, all lambs without distinction suffer from it.

Treatment.—This should, of course, be, in the first place, to do away with the predisposing causes we have mentioned above. A general rule is to change the food as soon as the diarrhea appears in a fold, even though it may not seem to be at fault. Ventilation, pure air, and a temperature between

50° and 60° are to be obtained, when possible. One of the best of foods for lambs is—

No. 414.	White of egg,	1 part.
	Water,	6 parts.

Beat together, and give milk-warm, as much as the patient wants.

A little laudanum can be added to this, if desired. The albumen of the egg is soothing and restraining to the delicate intestinal membrane, while it supports the strength. For a mild medicine, the following:—

No. 415.	Prepared chalk.	2 oz.
	Ginger, in powder,	½ oz.
	Opium, in powder,	1 drachm.

Mix in a pint of peppermint or calamus tea, and give a tablespoonful night and morning.

When more positive astringent action is demanded, one ounce of powdered catechu should be added to the above.

In serious cases, where, as above mentioned, the stools become slimy and tinged with blood, and the weakness is great, we must have recourse to *arsenic*. Two to three drops of Fowler's solution of arsenic should be given three or four times a day, in a teaspoonful of water, to a young lamb. Sometimes such cases can be benefited by small doses of quinine, two or three grains given five or six times a day.

One variety of diarrhea in lambs is known as the "white scour," because the excrement is of a whitish color. It is usually watery and very acrid, and irritating to the external parts. With it there is much colic, loss of appetite, and rapidly increasing weakness.

In all cases this arises from the non-digestion of the ewe's milk. Either the lamb has a weak stomach, or overloads it, or the milk is not of a healthy character. Highly fed ewes are specially liable to have this disease in their lambs, their milk probably being too rich.

The treatment is to prevent the lamb taking so much, or

to put it on dilute cow's milk for a few days. In addition, it should have an alkaline laxative, to clear the bowels—

No. 416. Bicarbonate of potash,
Calcined magnesia, of each ½ oz.
Divide into eight powders, and give one four times a day.

This may be given for one or two days, until the character of the evacuations changes. Should the weakness be threateningly great, the following will be found unsurpassed:—

No. 417. Eggs, 2
Whiskey, 2 oz.
Essence of ginger, 1 drachm.
Beat up in a pint of oatmeal gruel, made with milk, and give a few spoonfuls every 3 hours.

TURNSICK—STURDY—GID—HYDATID OF THE BRAIN.

Definition.—A disease of the brain of the sheep, characterized chiefly by vertigo, and owing to the presence in the brain of a hydatid, or bladder-worm, the *Cœnurus cerebralis*.

Causes.—We know more about the the species of parasite which causes this disease than about many other species of those strange animals. The bladder-worm of the head of the sheep is nothing else than a form of the tapeworm of the dog, *Tœnia cenurus*, at an earlier stage of its existence. The mature tapeworm lives in the bowels of the dog; its eggs are passed with the excrement, and they feed on the grass which the sheep eats, and are swallowed with the food; thus introduced to a suitable home, they select as their quarters the animal's brain, in the substance of which they attain their full growth, which may be about the size of a hen's egg.

Not more than two can develop in the brain at one time, and it is rare to find more than one of any considerable size. The victims are usually lambs and hoggets, sheep over two years being rarely affected. It prevails most where dogs are

used to attend the sheep, and where they frequent the pastures.

The bladder consists of a thin membrane, filled with watery, yellowish fluid, in which a large number of small, white bodies are floating, each the immature tapeworm, provided with hooks and a sucking mouth, which it applies to the inner walls of the bladder, and through them derives its nourishment from the brain substance.

Symptoms.—These are curious and well marked. When the animal is first affected there are staggering, reeling and stupefaction, little appetite and debility. In walking the animal describes a circle, always turning in the same direction, lifting its feet high, and often running against obstacles. Total blindness and deafness may ensue. These may subside for a while, as the contents of the skull adapt themselves to the hydatid; but as it continues to enlarge and consume the brain, the symptoms return with greater severity, palsy creeps on, the animal can no longer stand, becomes insensible and dies.

The location of the hydatid in the brain is indicated by the motion or turning of the sheep. If it is in the left lobe or half of the brain the animal turns to the right; if in the right lobe, his turning is to the left; if in the back part of the brain, the cerebellum, the movements are performed without control, the head is elevated, the limbs moved with difficulty, and he starts and falls repeatedly; finally, if the hydatid is in the middle of the brain in front, the sheep goes forward in a straight line, holds its nose in the air, steps very high, and soon loses the sight of one or both eyes.

The growth of the hydatid is rather rapid, and in three weeks' time from the first appearance of the symptoms, if the skull be pressed firmly with the thumb where the above rules point out the lodging of the hydatid, a noticeable degree of softening will be found, as if the skull were want-

ing in that particular spot. In fact, the bone has become thin, and been absorbed by the suckers of the small tapeworms above described; and sometimes the skin is accidentally broken, the hydatid emerges and ruptures its cyst, and the sheep recovers.

Treatment.—The natural cure just described, which, however, is very rare, suggests the proper course of treatment

The head must be repeatedly felt, for the soft spot in the skull, and as soon as it is fixed upon, a trocar and canula are introduced, the trocar withdrawn, a syringe applied through the canula, and the contents of the cyst extracted.

This treatment always alleviates for the time, but it is liable to be followed by inflammation of the brain and death; or by the growth of another hydatid, which requires the repetition of the operation. Hence we would suggest another means of easy application, which has proved, in some hands, very successful. This is, not to open the cyst to the air, which is very liable to produce destructive inflammation, but to puncture its walls with the needle of a strong hypodermic syringe and inject into it with some of the following solution :—

No. 418.	Iodine,	1 grain.
	Iodide of potash,	5 grains.
	Water,	1 oz.

Mix and use a half teaspoonful at a time.

Important preventive measures are to keep dogs away from the sheep folds and walks; or to give them, if required for attendance on the sheep, a good tapeworm vermifuge, now and then; and to administer the same to the sheep themselves.

SHEEP BOTS—GRUBS IN THE HEAD—HEAD MAGGOTS.

We have described on an earlier page (p. 150), the history of the gadfly or bot fly in the horse. The species of the same insect which attacks the sheep, the *œstrus ovis*, does not choose the stomach or bowels as the place of its residence when in the larval condition, but a far more annoying part of the body of its unwilling host, to wit, the nostrils and frontal sinuses, or hollow chambers in the front of the skull communicating with the nostrils.

The sheep greatly dread the fly, and at its approach will run wildly about, bury their nostrils in the dust, or gather together in groups, with their heads downward, jostling against each other, to drive away their enemy. When struck by the fly they stamp the ground violently, and exhibit other signs of distress, amounting to agony.

As soon as the larva is deposited at the entrance of the nostril, it proceeds upward, holding on by the firm hooks which arm its head, and makes its way into the furthest recesses of the nasal chambers, causing the animal, in its progress, great pain and irritation, resulting sometimes in vertigo, inflammation of the brain, madness and death. When the disease has reached its highest point the animal loses flesh, falls down frequently, grinds its teeth, rolls its reddened eyes, and finally dies on the fourth or eighth day. In mild cases recovery takes place unaided; the larvæ are thrown out by frequent sneezing, along with mucus; and this is the only sure sign of the disease, at least, for the non-professional. Sometimes vertigo is present at the same time.

If the head of a dead animal is opened, more or less larvæ are found in the above-mentioned cavities, which resemble those found in the stomachs of horses. The mucous membrane of these cavities is inflamed, red, bluish, dark-

red or ash-colored, and sometimes even gangrenous at different points. Thirty and even forty of these larvæ have been found together, but there is generally a much smaller number present.

Treatment.—The line of treatment pursued may be in three directions:—

1st. By violent sneezing the bots can sometimes be expelled from the nostrils. For this purpose, tobacco snuff can be shaken into the animal's nostril; or when, owing to the number, this is impracticable, they may be driven into a close shed, and irritating substances, such as horn, leather, feathers, etc., be burned.

2dly. In severe cases, the horns are sawed off close to the head, the sinuses opened with a trocar, and some sweet oil, flavored with turpentine, is poured in.

3dly. The sheep are seized, and the nose held up, while a teaspoonful or two of a mixture of equal parts of sweet oil and turpentine are poured into the nostrils. This requires some care, that the animal is not choked by the fluid passing into the lungs. It is, however, very efficacious.

To prevent the flies from depositing their eggs in the nostrils, some shepherds smear the noses of the sheep with tar during June and July; others run furrows across the field, so that the sheep can protect themselves from the flies by burying their nose in the dirt.

LUNG WORMS—THE HOOSE IN LAMBS.

Definition.—A disease caused by the presence in the breathing tubes (the windpipe and bronchi), and the bowels, of a worm, called the lung worm, *strongulus filaria*. The complaint is quite common in Ohio, where it is known as "white skin," the "pale disease," "paper skin," "pelt rot," etc., from the bloodless appearance which precedes death. It is often very fatal, though it should not be, as it is a curable disease.

Cause.—While in one sense we know the cause of this disease, as stated in the definition above, in another sense we are ignorant of it, as the origin and life history of these curious parasites are still a sealed book to us. The disease prevails especially in low, damp situations; on grounds subject to overflow, and grown with rank grass; after heavy rains, and in the autumn months. It has already been to some extent discussed, in speaking of hoose in calves. According to the best authorities, the disease is steadily increasing, both in England and the United States. (*See Highland Agric. Soc. Reports*, 1878).

The worm itself is from one to three inches in length, slender and whitish, like a thread, and while in sheep they are mostly found in the bronchial tubes, in lambs they are discovered in the lung tissue itself. When in the lungs of sheep, they are not active, but folded in cysts. Often they are matted together in masses or balls, which choke up the passages they inhabit.

Symptoms.—The presence of these worms does not always cause inconvenience to the sheep. Occasionally prime, and to all appearances perfectly healthy animals are killed, whose lungs are found filled with them. In lambs, however, they are a frequent cause of death.

When lodged in the bowels, the symptoms are those of dysentery, with fetid stools. There is much straining, and clots of blood may be passed. When in the lungs, they cause irritation and inflammation, indicated by a husky cough, quickened breathing, rubbing the nose on the ground, loss of appetite and flesh, and exhaustion. These symptoms are clearly not positive, and, indeed, the only unquestionable sign of the presence of the worm is its discovery in the feces, or in the mucus from the mouth and throat. The combination, however, of a cough in a number of lambs, occurring often with dysenteric symptoms, and under the conditions above men-

tioned, should lead to the careful examination of the lungs and windpipe of the first victim, for the purpose of discovering the parasite. The complaint is often mistaken for a sort of "scours," but if attention is paid to the short, husky, often almost incessant cough, which is nearly invariably present in all forms of the disease, such an error will not be committed.

Treatment.—The preventive treatment is to feed the lambs on fresh pastures; second and third year crops are to be specially avoided, if they have been previously grazed by sheep. In damp seasons, hilly and well-drained fields should be chosen; and abundance of nutritive food furnished. Rock salt should be placed in the fields, or common salt given frequently.

To cure the disease, the worm should be attacked both in the lungs and in the bowels. To destroy them in the lungs, chlorine gas has been recommended for inhaling; but it is unsafe, and sulphurous acid gas is equally efficient. The animals are placed in a roomy, closed shed or stable, and the gas obtained by burning sulphur, as recommended on page 29. Should the chlorine gas be preferred, it is to be managed as follows:—

Get a pound of chloride of lime (bleaching powder), and mix it with water in a shallow dish, to about the thickness of cream. The sheep should be collected in a closed shed or stable, and the operator enters, provided with this dish of chloride and a bottle of common sulphuric acid (oil of vitriol). He pours the acid very gradually on the chloride, by which the chlorine gas will be rapidly disengaged. He continues it as long as he can conveniently breathe the air thus saturated with the gas, and when he can do this no longer with comfort, he retires, taking his apparatus with him. The sheep are left to breathe the gas for half an hour, and should be subjected to it twice a day for several days.

Both when in the lungs and intestines, *turpentine* inter-

nally will dislodge or destroy the worms. This penetrating oil is probably carried by the blood to the lungs, where its fumes are so unpleasant to the parasites that they are dislodged. An eminent English authority, Dr. Crisp, in a recent essay on this disease, furnishes the following as excellent receipts for this purpose:—

No. 419.

Sulphate of magnesia,	6 oz.
Nitrate of potash,	4 oz.

Pour on these three pints boiling water, and when the solution is milk warm, add:—

Oil of turpentine,	4 oz.
Bole armeniac,	½ oz.

Mix well, and give three or four tablespoonfuls every other day.

Or—

No. 420.

Common salt,	3 lb.
Powdered ginger,	
Nitrate of potash, each	½ lb.

Dissolve in three gallons warm water, and when nearly cold, add—

Oil of turpentine,	24 oz.

The dose for lambs from four to six months old is one wineglassful.

The above quantity will suffice for 160 lambs.

Mr. Finlay Dun recommends that when lung worms prevail, throughout the summer and fall months the lambs should have, about once a fortnight, a dose of the following tonic and vermifuge mixture:—

No. 421.

Oil of turpentine,	
Powdered gentian,	
Laudanum, of each	2 oz.

Dissolve in a quart of linseed tea or lime water. This is enough for ten or twelve doses.

Prof. N. S. Townshend, of Ohio, who has written ably on this disease, gives to lambs the following:—

No. 422.

Oil of turpentine,	½ oz.
Whiskey.	1 pint.

Shake together, and give a tablespoonful once a day for a week or two.

THE ROT—THE LIVER FLUKE.

Definition.—A disease of the sheep caused by the presence in the liver of a flat worm, of the order *Trematoda*, and known as the liver fluke, *Fasciola hepatica*.

Cause.—The close attention which has been given of late years to the study of parasites has resulted in a history almost complete of the fluke worm. The mature worm throws off several thousand eggs, which pass with the feces from the anus. Some of them are carried by rains, or the feet of passing animals, into water courses. There they develop into higher forms, and take up their residence, for a time, in the bodies of shell fish and water insects. At the time of an inundation, numbers of them, with and without their hosts, are left on the meadows. The sheep eat them with the grass, and the miniature fluke passes down the bowel until it reaches the liver duct, which it ascends, and forthwith begins its final development and ovulation.

Hence it is that the rot is especially prevalent during the spring of the year, when rains are abundant and freshets frequent; in wet seasons, when the meadows are damp and overflowed at times; and on low grounds, where the transfer of aquatic worms, etc., to the soil is rendered easy.

The fluke itself is a flat, transparent or whitish worm, from half an inch to an inch in length, and about a third as much in breadth. It is usually found in the liver, but occasionally in other internal organs. Their number is frequently enormous, reaching occasionally to eight hundred or a thousand individuals in a single liver.

Symptoms.—In wet seasons, and in certain localities, the loss by the rot in sheep is very heavy. It is quite destructive in Australia, at times in England, and in some parts of the United States. Hence it becomes of prime importance to

recognize the early signs of the disease, in order that efficient measures for its prevention may be adopted.

The Scotch shepherds tell the presence of the fluke in two ways: 1, by the feel of the flesh; 2, by the appearance of the eye. They catch a ewe, and clapping their hand on the small of the back, they rub the flesh backward and forward, betwixt their fingers and thumb and the ends of the short ribs. If the flesh is solid and firm they consider her as sound; if they find it soft and flabby, and imparting a crackling feel to the fingers, as if there was water or blubber in it, they consider it a sign of unsoundness.

The other plan is to take the sheep's head between the hands, and press down the eyelids so as to push forward the winking membrane (*membrana nictitans*), and bring into view the white, or conjunctiva. In health, this is thin, pink, and free from turbid secretion; and if it appears thickened, yellowish, or dead white, with a secretion altered to a whitish or yellowish matter, the sheep is condemned.

The progress of the rot is usually slow. The animal becomes inactive and dull; the lining membrane of the mouth turns pale, the flesh wastes, the skin loses its ruddy color, becomes dry, and devoid of the natural oil on the fleece. It is said that a dry, scaly state of the skin on the inner side of the thighs, particularly where it is uncovered with wool or hair, is one of the earliest symptoms apparent.

As the disease progresses, the flanks become hollow, the back rigid, and there are weakness and tenderness about the loins. The fleece falls off in patches, the belly swells, the eye becomes jaundiced, and there is dropsy in different parts of the body. The thirst is usually excessive, the appetite irregular and unnatural; there are diarrhea, a weak heart and general stupor.

After death the liver is found to be hard, irregular, of a dirty chocolate brown, and filled with flukes. The meat is

flabby, pale or yellow, watery and wasted, very different in firmness and color from healthy mutton.

Treatment.—As it may be considered certain that the fluke cannot develope its various stages of life on dry land, it is important to secure well-drained pastures for sheep. Should a flock once be attacked, it is better to dispose of them, and turn the pasturage into cultivation for a few seasons.

In wet seasons, when there is danger from the rot, even on sound pastures, the natural food should be supplemented by cakes, corn, beans, or other nutritious diet. An abundance of common salt is recognized by all writers to be very efficient in preventing the disease. It may be placed freely in the pastures, where they can gain access to it, or it may advantageously be given in a combination as follows :—

No. 423.	Common salt,	2 lbs.
	Sulphate of iron,	1 lb.

Mix with clover, meal, or grain, for 100 sheep. Give twice or three times a week.

Or—

No. 424.	Mustard flour,	1 lb.
	Juniper berries, Common salt, of each,	2 lbs.

Mix with sufficient ground food for 100 sheep.

These remedies should be continued regularly, as long as the wet weather or exposure exists.

When the disease has been recognized, the animal should be isolated in a high and dry pasture, and should receive a laxative dose, as follows :

No. 425.	Sulphate of magnesia,	½ lb.
	Oil of turpentine,	3 drachms.

Mix for a drench, and give every two days, one-third of the quantity at a dose.

When this has acted, the sheep should have common salt, sulphate of iron and wormwood, or gentian, mixed into a

lick. The food should be highly nutritious and abundant.

An English writer, Mr. John Large, says the only remedy which will destroy the fluke in the liver is the following :—

No. 426.	Yellow resin,	1½ drachms.
	Oil of turpentine,	1½ oz.
	Calomel,	18 grains.
	Tincture of iodine,	30 drops.

For three doses, one every morning, for three days, in gruel.

INTESTINAL WORMS.

Sheep are liable to be infested with a number of varieties of intestinal worms, such as tapeworms, round worms, thread worms, etc. It is needless to describe and portray these in this work, as their specification belongs rather to the realm of the strictly scientific than of practical works.

The symptoms they produce are in many instances very obscure, sometimes not at all manifest. It is no unusual sight to find a sheep apparently in excellent health and condition when slaughtered, to have many of these parasites in its stomach and intestines.

In general terms, it may be said that the symptoms they give rise to are connected, first, with the digestive organs, and secondly, by sympathy, with the brain. Thus a loss of appetite, or a liking for dirt, old mortar on walls, etc., together with constipation and diarrhea alternating, irritation about the nose or the anus, indicated by the animal rubbing those parts, and a short, dry, or husky cough, are signs of irritation in the bowels, which may well come from worms.

The head symptoms are, dizziness, as shown by staggering or falling, sometimes convulsions, impairment of the sight, running into obstacles, etc.

The positive sign is to find some of the worms in the excrement; or to discover them on opening the intestines, in which case it may very justly be presumed that they prevail

extensively in the flock, for these species of parasites rarely appear alone.

Treatment.—The prevention of worms is best secured y allowing a liberal quantity of salt, and by giving, once a fortnight, a saline tonic, and bitter lick to the flock, as, for instance—

No. 427.	Common salt,	2 lbs.
	Sulphate of magnesia,	1 lb.
	Sulphate of iron,	
	Powdered gentian, each	½ lb.

Mix with ground fodder, for 75 to 100 sheep.

Ordinary wood soot, as it can be collected from the chimney, is a very efficient vermifuge, often used, both in children and the lower animals. It may be mixed with salt, or sprinkled on the fodder. Another cheap and useful vermifuge, in the form of a drink, is—

No. 428.	Quick lime,	1 lb.
	Sulphate of iron,	5 oz.

Mix with five gallons of water, and give a pint twice a week.

As a vermifuge in round and thread-worms, the shepherd may use—

No. 429.	Linseed oil,	2 oz.
	Oil of turpentine,	½ oz.

For a drench.

For the tapeworm, the following:—

No. 430.	Powdered areca nut,	½ to 1 drachm.
	Oil of male fern,	10 to 20 drops.

Give in molasses and water, and follow next day with a purge. This is also very effective in the dog.

THE SCAB—THE MANGE, OR ITCH, IN SHEEP.

Definition.—A highly contagious disease of the skin, caused by the presence of a parasite in or upon the skin.

Causes.—There are three different forms of parasites which produce the scab, the most common one in this

country being that known as the *Dermatodectes ovis.* It dwells upon the skin, deriving its nourishment by sucking the fluids of the animal. Its bites cause severe irritation, and a discharge of serous fluid, which dries on the surface into scabs, whence the disease derives its name.

The notion that the scab ever arises from neglect, cold and wet, starvation, etc., is obsolete, as it would involve the spontaneous generation of the insect, which is absurd. That it is worse under such conditions is natural; and that it occasionally arises without known cause is owing to the intensely contagious nature of the complaint, the astonishing fecundity of the insect, and its tenacity of life. A pasture which has been trod by a flock of scabby sheep has been known to give the disease to another flock three years afterward.

It is surprising that Col. Randall, in his able works on sheep husbandry, says that the scab is "comparatively little known" in the United States. On the contrary, it is a very common disease in New England, New York, and other sheep-growing centres.

Symptoms.—The first and most prominent symptom is itchiness, which soon gives the animal a ragged appearance, tufts of wool being pulled out, leaving bare patches. If the skin is closely examined at these places, a small, reddish pimple will be noticed, upon the surface of which a small blister or vesicle forms. Close examination may discover the insect in the vicinity.

Under this irritation the sheep becomes exceedingly restless. It rubs itself against trees, fences and rocks, and bites and scratches itself with feet and teeth. The scabs are torn off, sores form and extend, the appetite is lost, the fleece is ruined, and the animal dies, worn out with the increasing torment.

Treatment.—This consists either in dipping the sheep in a solution of some insecticide preparation; or in rubbing such a preparation into its skin. As ointments are both expensive and troublesome, watery solutions are at all times preferable.

The most effectual of all sheep dips are those containing arsenic. Mr. Finlay Dun speaks very highly of the following:—

No. 431. Arsenic,
Pearlash, or soda ash,
Sulphur,
Soft soap, of each, 3 lbs.

Mix in ten gallons of boiling water, and add cold water to make one hundred gallons.

The sheep, except his head, of course, is held in this from half a minute to a minute, while it is well rubbed into his fleece. He is then lifted on to a slatted drainer, over a tub, and the wool well squeezed out; he isthen placed in a yard for a few hours, as it is unsafe to turn them on a pasture with this poisonous fluid dripping from them on the grass. Horses, cattle and sheep have been known to be poisoned by neglect of this precaution.

The sulphur in the above receipt whitens and softens the fleece, and for a time keeps away the flies. One gallon of the mixture is the estimated amount used for each sheep.

Mercurial ointment, and dips containing corrosive sublimate, we do not recommend, as they are too dangerous and difficult to control.

Tobacco is a favorite American remedy, but it is rather dear. A good formula is the one above given, substituting for the arsenic a strong decoction of eight or ten pounds of tobacco.

Carbolic acid, cresylic acid and the commercial oil of tar, properly diluted, are all effective and cheap, but have the disadvantage of discoloring the wool; and if used too strong,

are apt to become absorbed, and lead to congestion of the lungs, and other poisonous effects. A New York breeder of experience recommends—

No. 432.	Soda, carbonate of,	6 lbs.
	Water,	6 gallons.

Heat to a boiling point, and add—

	Oil of tar,	2 gallons.

Add hot water sufficient for one hundred sheep.

His general rule is to dilute the spirit of tar with twelve times its bulk of water.

The following dip is popular in France. It is efficient, and does not stain the wool :—

No. 433.	Arsenic,	2 lbs.
	Sulphate of zinc,	10 lbs.

Boil in sixty gallons of water, down to fifty, then add ten gallons.

The following is said, by Prof. Simonds, to be so effective that two or three dressings with it will cure the most inveterate cases; and as it does not require the troublesome preparation of a bath, it is very suitable to small flocks:—

No. 434.	Arsenic,	
	Carbonate of potash, of each	2 oz.

Boil in a quart of water till dissolved, and then add water to make one gallon. Then make the following infusion :—

	Digitalis leaves,	4 oz,
	Boiling water,	1 gallon.

When cold, add to the previous gallon.

In using this, about half a pint is shaken from a bottle with a quill in the cork, over the back and sides of the sheep, the wool being parted, so that the fluid reaches the skin.

For those who prefer ointments, we add several of the best preparations of the kind. They should be applied as follows: Begin at the head of the sheep, and proceeding from between the ears, along the back, to the end of the tail, divide the wool in a furrow, till the skin can be touched, and let a finger, slightly dipped in the ointment be drawn along the bottom of the furrow. From this furrow similar ones must

be drawn along the shoulders and thighs, to the legs; and others, parallel to these described, in number depending on the severity of the disease.

No. 435.	Mercurial ointment,	1 lb.
	Oil of turpentine,	½ pint.
	Resin,	1 lb.
	Lard,	6 lbs.

Dissolve the resin in the turpentine, mix the mercurial ointment with the lard by gentle heat, and when cold, rub the two mixtures together.

No. 436.	Oil of turpentine,	4 oz.
	Flowers of sulphur,	6 oz.
	Lard,	1 lb.

Mix at gentle heat. This is a non-poisonous ointment.

No. 437.	Corrosive sublimate,	2 oz.
	Fish oil,	2 gallons.

Rub the sublimate with a few ounces of the oil, until perfectly smooth, then mix thoroughly with the remainder. This is efficient, but, of course, poisonous.

In all cases rigid isolation of the infected sheep should be practiced, and a close watch kept on the remainder of the flock, so that at the first signs of itchiness they shall receive prompt treatment.

The Australian dip for scab is—

No. 438.	Tobacco leaves,		
	Sulphur,	of each,	1 lb.
	Water,		5 gallons.

Boil the tobacco in the water, then add the sulphur.

The sheep is dipped in this solution while quite hot, and retained in it four or five minutes, its head being from time to time thrust under also.

The following is a non-poisonous, and tolerably efficient dip:—

No. 439.	Soft soap,	1½ lb.
	Carbonate of potash,	¼ lb.
	Flowers of sulphur,	2½ lbs.

Boil for half an hour, in 20 gallons of water.

This is enough for twenty sheep. It must be kept hot, and the animals should remain in it for full five minutes.

CHAPTER VI.

DISEASES OF SWINE.

General Remarks on Diseases of Swine.
Hog Cholera, so-called, and its varieties.
Charbon in Swine—Malignant Anthrax—Carbuncular Disease—White Bristle.
Contagious Pneumo-enteritis; Red Soldier; the Blue Disease; Purples.
Malignant Epizootic Catarrh.
Apoplexy and Staggers.
Coughs, Colds, Quinsy, and Inflammation of the Lungs.
Diarrheal Diseases—Scours.
Ague Cake—Milt Swelling—Splenitis.
Leprosy.
Trichinosis.
Hydatids of the Kidneys—Kidney Worms—Lard Worms.
Measles.
The Mange, Itch, or Scab.
Lice.

GENERAL REMARKS ON DISEASES OF SWINE.

If the remark is correct, which we quoted on the authority of leading agriculturists (page 342), that the sheep is unusually healthy in the United States, no one will say the same in reference to the hog. On the contrary, he is liable to so many and such extremely fatal diseases, that the loss from them is estimated at many millions of dollars annually, and in some sections of country they render the business of hog breeding a very precarious one.

Considering the amount of capital involved, it is extraordinary that these diseases have not received closer study at the hands of experts. Several of them are contagious or

infectious to a high degree, and demand stringent quarantine, isolation or destruction of the herds, in order to confine their ravages.

Nearly all these epidemics are of a rapidly debilitating, prostrating character, forbidding bleeding, and the use of depressing medicines. Their treatment is further complicated by the difficulty in giving a hog medicine. In fact, to undertake to administer a drench to a full-grown animal is a dangerous undertaking; and it is desirable, therefore, to select such drugs as can be mingled with the food and drink without rendering the nourishment repulsive to the animal. And as he is not delicate, this can generally be accomplished. Like the sheep, the pig is very subject to parasitic diseases, partly owing to his uncleanly habits (which, however, be it said to his credit, are the results of his domestication, the wild pig being quite neat and tidy), but chiefly to his gross habit of body. Of these, the trichina, measles, kidney worm and mange are the most prominent examples.

HOG CHOLERA, SO CALLED.

Of the diseases which produce the great mortality of swine, that called "Hog cholera" is most notorious. In fact, however, this name was applied to the disease simply because it is a malignant epidemic, destroying as the cholera destroyed in its first and second visits to the United States, not because the symptoms in any way resemble those of Asiatic cholera.

Three different forms of disease are popularly included under this name. We have described two of them, as they appear in the sheep, the ox and the horse, and we shall recognize their identical traits in the hog. The first of these is that known as charbon, or malignant anthrax (see page 276). In this country it is little to be dreaded in horses and sheep, but is quite destructive in oxen, and also in hogs. The second variety is almost peculiar to swine, and has been

called by Dr. Klein, of London, "contagious pneumo-enteritis."

The third is the malignant epizootic catarrh or influenza, which we have described in the sheep and horse (page 351), who suffer from it, at times severely, especially the former. We shall thus divide the maladies grouped popularly under the name "hog cholera" into—

1. Charbon, anthrax or splenic fever.
2. Contagious pneumo-enteritis.
3. Epizootic catarrh.

And we shall endeavor to give such distinguishing traits that they may be recognized one from the other, without difficulty.

CHARBON IN SWINE—MALIGNANT ANTHRAX—SPLENIC FEVER—WHITE BRISTLE.

We are aware that an authority of weight in this country, Prof. James Law, has denied the existence of charbon in swine. His essay was published by the United States Commissioner of Agriculture, and has had an extensive distribution.

Nevertheless, both from considerable personal observation, and a careful study of the subject in authors, we believe Prof. Law to be in error. The only reason he gives for denying the existence of charbon is, that in the cases he witnessed the poison was not communicable to other animals. From his descriptions, it is clear that the disease he encountered, and for which he proposes the name "intestinal fever of swine," was contagious pneumo-enteritis, which we shall shortly describe.

The hog we believe to be subject to true anthrax, quite as much as the ox and sheep. The blood in these cases conveys the anthrax poison, as has been shown to be the case by M. Roche Lubin, in his admirable description of this disease, which he calls *charbonneuse typhus*; for although his

inoculation failed in dogs, it was not the same with some sheep. They died a few days afterward, presenting all the symptoms and pathological lesions of true charbon fever (quoted by Mr. H. D. Richardson, *Domestic Pigs*, p. 123).

We shall draw clearly the distinction between charbon and contagious pneumo-enteritis, as laid down by the distinguished recent investigator, Dr. Klein, of London, in the Proceedings of the Royal Society for 1878.

True Charbon.	*Contagious Pneumo-enteritis.*
Period of incubation or latency, from a few hours to three days.	Period of incubation from two to five days and more.
Easily transmissible to other species of animals.	Rarely and with difficulty transmitted to other species.
Spleen always enlarged and often broken down.	Spleen rarely enlarged, or otherwise changed.
Blood after death, dark and fluid.	Blood after death of ordinary appearance.
Bacillus anthracis in the blood.	No *bacillus anthracis* in the blood, but numberless bacilli in the serum of thorax and abdomen.
Lungs and bowels frequently not implicated. Cough may be absent.	Lungs and bowels *always both* inflamed. Cough always present.
The discoloration local, and of a true carbuncular appearance.	The red or purple color diffused over the surface, and of an erysipelatous appearance.

With the above table before him, it will not be possible for any ordinarily careful observer to confound the two diseases. No doubt there is a strong analogy between them, as, in both, diverse species of the same vegetable organism are the exciting cause of the contagion.

The most common form of anthrax in pigs is that popularly known as "white bristle." The poison localizes itself in a carbuncular swelling, usually on the throat, presenting the features of color already described. The bristles on the spot turn white and brittle, whence the name just given. The swelling extends inward, involving the windpipe and gullet, causing difficulty of breathing and swallowing, and finally death by suffocation, in convulsions.

In addition to this we occasionally see the true apoplectic or splenic form of charbon, and the variety which attacks the tongue and mouth, both of which have already been described as they occur in other animals (see pages 278, 344); but as they are of rare occurrence in pigs, and present no symptoms beyond those already given, except such as are owing to their localities, we need not describe them at length. They are both very acute and rapidly fatal, the apoplectic form often killing "like a shot," literally in less than a minute.

The flesh of all animals dying of any form of this disease is poisonous, and the blood and discharges capable not only of spreading the disease among others of the same species, but also, if inoculated into the human system, of bringing on that mortal malady, "malignant pustule."

Treatment.—This has been already discussed when speaking of charbon in cattle and braxy in sheep (see pages 279, 345) and we need not repeat here the instructions there given. They apply, with such modifications as the size and habits of the animal render necessary, to swine. And as both charbon and contagious pneumo-enteritis, which will be next described, are due to a contagion essentially alike in character, we shall include the treatment of anthrax under that of the latter complaint.

CONTAGIOUS PNEUMO-ENTERITIS.

Definition.—A specific, contagious inflammation of the lungs and bowels, accompanied with red or purple blotches on the skin.

This is the disease known in Ireland as "red soldier," and in this country as the "purples" and "the blue disease." It is the most common and fatal form of the epidemic diseases classed under the popular name "hog cholera."

Causes.—The predisposing causes of the disease are extremes of temperature; wet seasons; damp, low-lying, swampy feeding grounds; drinking water impregnated with decaying animal or vegetable substances; close, filthy styes; and above all, a sudden increase of concentrated, heating, highly-nutritious food, producing a plethoric state of the system, and a blood surcharged with incompletely transformed constituents.

Such are the acknowledged predisposing causes; whether they can originate the disease is a debatable question. In our opinion they cannot; they can only lay the system open to an easy subjection to the subtle poison of the malady, which is floating in the atmosphere. This poison is almost certainly a vegetable germ, of extreme minuteness (see page 276); and if it is such, the real cause of the disease can be contagion only, for the "spontaneous" origin of any form of animal or vegetable life has never yet been demonstrated.

When the disease once enters a herd, its contagious character cannot be doubted, and all ages, sexes and conditions fall equally a prey to it.

The precise nature of the contagion may now be said to have been definitely determined. The researches of Dr. Klein, in 1878, already alluded to, prove that pneumo-enteritis, is, like anthrax, due to a *Bacillus*, a rod-like, minute vegetable organism, found, however, not in the blood,

as in anthrax, but in the serous fluids and tissues. The *Bacillus* is in many observable respects similar to the *Bacillus subtilis*, seen in infusions of hay, but no doubt differs from it in its life history. Dr. Klein applied the crucial test, by raising crops of these bacilli in fluids free from all other organisms, and having thus cultivated them through several generations, he inoculated healthy pigs with this fluid, with the result that in a few days they were taken down and died with well-marked pneumo-enteritis, presenting all the symptoms of the disease, including its contagious nature. (*Proceedings of the Royal Society*, 1878.)

Symptoms.—As in the other animals, the symptoms of the disease vary with the part of the animal attacked and the malignancy of the epidemic. To this fact we would especially call the reader's attention, so that he will not become confused by the varying aspects of the complaint. We shall describe them singly.

1. *The ordinary Erysipelatous Form.*

This is probably the most common of all the forms of the disease. The animal at first is dull, loses his appetite, lies down and moves unwillingly. He hangs his head, and sometimes makes efforts to vomit. The bowels at this time are generally constipated, the excrement being hard and dark colored; cough and difficult urination.

The next day, or in a few hours, even, the characteristic symptom of the disease shows itself. This consists in the appearance of dark red or purple blotches, passing into a bluish-black color. Once seen, they cannot be mistaken. Their most frequent seats are the ears, throat, neck, breast, and inside the fore legs. If he is a white hog, the discoloration is very visible. With these there is often a discharge from the nose, of a dark, purple fluid. Soon his breathing becomes panting and labored, he is palsied in his hind

quarters, and if he is driven up, runs reeling, with his hind legs and his head dropped to the ground. At this stage, a fetid diarrhea sometimes sets in. The fatal termination is reached in one to three days.

2. *The Form of Malignant Sore Throat.*

This occurs when the poison, instead of expending its violence on the cellular tissues underneath the skin, attacks that beneath the lining membrane of the throat.

The general symptoms at the commencement are the same; and the appearance of the throat has that same deep red, passing into dark purple hue, which we have just noted in the erysipelatous variety. But the obstruction to the functions of breathing and swallowing naturally produce a train of characteristic symptoms not seen in the former case. There are attempts to vomit, difficulty in swallowing, and labored breathing from the first, the sensation of choking being so distressing that the animal will sit on its haunches, like a dog, gasping for breath, opening its mouth wide, and protruding a livid and swollen tongue. Sometimes the swelling about the larynx is so sudden and considerable that the animal is choked to death in less than an hour, and before hardly any other symptom has had time to manifest itself (œdema of the larynx).

Treatment.—When we turn to the important question of treatment, we find two parties, the one maintaining that no remedy has been *or can be* found for the disease; the other equally positive that treatment is often successful. The former are the scientific men, who too often form their idea of a disease from a theoretical study of it only; the latter are practical men of moderate education, who have tried this or that receipt with satisfaction to themselves, but lack a broad experience.

We fully believe that very many cases which would other-

wise die can be cured by medical attention, and we are certain that the progress of the contagion can very often be checked in a herd by the same means.

Let us suppose that what we have described as the predisposing causes have been carefully removed, and we turn to look for an agent to check the development of the virus. There are two such which present themselves with very large and positive testimony to their value. They are *sulphate of iron* (green vitriol, or copperas) and *chlorate of potash*.

The sulphate of iron is at once the cheapest and the most effective of the iron salts used in veterinary medicine. It is antiseptic, and vitally invigorating; and it has been proven to have a specific effect in increasing the firmness of the spleen and hastening the chemical changes of the blood.

Without any knowledge of these properties, it is the chief and almost only important agent in most of the receipts which have been found actually efficacious in the disease of hogs which we are describing. Thus, one "infallible remedy," given by a Kentucky farmer, is—

No. 440. Sulphate of iron, 1 lb.
Warm water, 3 gallons.

Apply milk-warm to the skin of the affected animal, by repeated sponging or mopping.

A somewhat celebrated recipe of Prof. J. B. Turner, of Illinois, is—

No. 441. Flowers of sulphur,
Sulphate of iron,
Madder, of each, 2 lbs.
Black antimony,
Nitrate of potash, of each, ½ lb.
Arsenic, 2 oz.

Mix with 12 gallons of slop, and give a pint to each hog, this quantity being for 100 hogs.

Another, from the same authority, is—

No. 442.	Common salt,		4 lbs.
	Black antimony,		
	Flowers of sulphur,		
	Sulphate of iron,	of each,	1 lb.
	Wood ashes, unleached,		1 peck.

Mix thoroughly together, and put in a trough, where the hogs can eat it at will.

If either of these is used before the hog is attacked, Prof. Turner says it will positively prevent the disease; and given freely in the early stages, it is curative.

Another receipt, praised by Illinois farmers of large experience, and differing little practically from the above, is—

No. 443.	Sulphate of iron,	2 lbs.
	Soft soap,	2 gallons.

Boil with several gallons of water.

This is to be added to slop enough for fifty hogs; and as they come to the troughs containing it about two pounds of soda should be added, to have the slop foaming as they drink it. This dose should be repeated every three or four days, for three times.

The second remedy is the *chlorate of potash*. Prof. Williams says of the use of this in charbon: "A large experience has taught me that the chlorate of potash is superior to all other medicines." Unfortunately, it is too dear for general use, costing at wholesale twenty-five to thirty cents per pound. Yet in special cases it may be used.

No. 444.	Chlorate of potash,	1 to 2 drachms.
	Water,	½ pint.

Give in milk or slop, 3 or 4 times a day.

The question of local treatment is an important one. It is recommended to foment the swollen parts with hot water saturated with sulphate of iron at the outset. If gangrene has come on, equal parts of turpentine and sweet oil will have some chance of stimulating the surrounding tissues. In the carbuncular variety free incisions, and dressing with carbolic acid lotion, and cauterization with the hot iron, are

spoken of. But as the disease is a general one of the blood, such medicines can have no great effect.

If the pig cannot be persuaded to drink, it is not worth while to attempt to drench him; rather, he should be killed and buried at once, as a hopeless case and sure to spread the infection.

Much has been said in favor of the smart weed, *Polygonum punctatum*, as a preventive remedy. It is given freely, in strong decoction. This plant has long been familiar to physicians, as a useful remedy in sore mouth, salivation, old ulcers, etc., and may well have some value in charbon.

A spoonful of turpentine, every few days, is used in Western New York as a preventive; and the free employment of alkalies, as common unleached wood ashes, is, no doubt, of advantage. The ashes can be sprinkled in the slop, or corn can be boiled in water in which a few handfuls have been thrown. Clean wood soot, from a chimney, or finely powdered charcoal are also of considerable efficacy. Any of these should be given two or three times a week, to hogs, when this form of "cholera" is in the neighborhood.

Professor Law advises to separate a hog at once who shows any sign of sickness; and if the symptoms of this disease appear, to kill and bury him forthwith, in order to prevent contagion. If, however, it is a valuable animal, and it is desired to treat him medically, Prof. Law would commence with a moderate purge, two or three ounces of castor oil, or a drachm or two of rhubarb. As soon as it operates, give—

No. 445. Nitrate of potash,
Bisulphite of soda, of each 20 grains.
Mix for a dose, twice or three times a day.

Charcoal should be given in the food or drink, and if the bowels become tender and swollen, twenty drops of turpentine, from time to time.

M. Roche Lubin, an eminent French veterinarian, to

whom we have before referred, attributes the prevalence of the malady to faulty sanitary arrangements. The scourge will disappear when pigs are well cared for, placed in proper situations, with protection from the sun and rain when they need it, well ventilated styes, and with clean bedding, often renewed. They should have free access to plenty of clean, fresh water, and their food should be properly regulated in quantity, and wholesome in quality. During the summer they should have from time to time, say once a week, some salt and nitre in their slop; and both bitter and acid mixtures will be advantageous. When an animal is attacked, M. Lubin gives—

No. 446.	Powdered camphor,	10 grains.
	Nitrate of potash,	1 drachm.
	Calomel,	5 grains.

To be mixed with gruel, or given in a boiled potato, three times a day. After the first day the calomel may be omitted.

The red blotches should be rubbed with vinegar, and the drink soured with it.

Major John S. Mellon, of St. Louis, has written a very sensible little treatise on this form of hog cholera. He thinks it arises either from contagion, or else from feeding with a too exclusive grain diet. His rules for its management are judicious; they are substantially as follows: When the disease attacks a herd—

1. Separate the sick from the well.

2. Give both a free range in a woody pasture, if possible.

3. Place within reach of both pulverized stone coal, or charcoal, and salt.

4. Give them free access to plenty of water and clay, to wallow in.

5. Feed both, particularly the sick, with plenty of *turnips;* or, if these are not to be had, with potatoes, artichokes, or any other roots they like. Corn should be withheld.

He goes so far as to say that every hog thus treated, and

not too sick to eat a full feed of turnips, will certainly get well, and that no well hog, thus treated, and fed on turnips, will take the disease, even by contagion.

Mr. Mellon believes that a *too highly stimulating* diet is the chief cause of the presence of both hog cholera and Texas cattle disease, in the Mississippi valley. Hence, acting on this principle, he claims to have cured the latter disease also "very promptly and certainly, by an exclusively watery diet, the best and most certain remedy being young corn in the milk. There is no danger of excess. The diseased herd may be safely turned into a field of young corn, and left to cure themselves, which they will do in a few days." If green corn cannot be procured, any other succulent food will answer the purpose.

This opinion of the general causation of these diseases is largely correct, and deserves the attention of both hog and cattle breeders in the Mississippi valley and elsewhere.

MALIGNANT EPIZOOTIC CATARRH.

This disease, which, as we have seen (p. 351), is the most fatal of all among sheep in this country, is also extremely destructive among hogs. For example, in the years 1875 and 1876 it swept over Missouri, Illinois, and the neighboring States, killing a very large percentage of swine in that section, and attracting general attention by its unchecked devastations.

In regard to its causes, they are to be divided, as in all of this class of diseases, into those which render the animal susceptible to the poison, and the poison itself. Of the latter we have no positive knowledge. It is believed to be a floating germ, which develops and multiplies with extreme rapidity when it finds a soil which suits. Such a soil is presented by the mucous lining membrane of hogs which have been kept in foul styes, and whose skins are dirty and

unhealthy, and thus incapable of performing the acts of perspiration. Also in those where the perspiration has been suddenly checked by exposure to showers, sudden changes of temperature, the chill night air, etc. By these means an excessive labor is forced on the inner membranes, and they are weakened and predisposed to disease.

It has constantly been noticed that clean hogs, well washed, well housed, and well fed, hardly ever succumb to this disease, or, indeed, contract it at all.

Symptoms.—As explained under this disease in sheep, the symptoms vary with the part of the mucous membrane most involved. This is even more noticeable in the hog.

The first form is where the membrane which, commencing at the nostrils, continues to the windpipe and lungs, is the main seat of disease. Here the earliest symptoms are a short, hoarse cough, hoarseness in the squeal, and a difficulty of breathing, indicated by a panting motion of the flanks, and by holding the head in a peculiar, stretched and somewhat drooping position. There is often some running from the nose, a slow gait, tottering or stiff, and signs of fever. Many make efforts to vomit; generally there is constipation, but at times diarrhea.

The second form has a short cough, but less marked, and there is less oppression in breathing. There is more decided weakness or palsy in the hind quarters, and the gait is more tottering. But as here the power of the poison is spent on the lining of the stomach and bowels, there is at first costiveness, followed by a profuse and fetid diarrhea. The pain and soreness of the intestines are indicated by the animal arching its back, especially the loin portion, often to a very high degree.

Together with these symptoms, there may be affection of the brain, indicated by partial or entire blindness, a staggering gait and aimless movements; or a sympathy of the

lymphatic system, shown by enlarged glands and scrofulous ulcerations in different parts of the body.

The duration of the disease is from five to fifteen days. In examining the dead body the lining membranes of the nose and upper throat are always inflamed; from them, the redness and swelling extend, in the first form, down the windpipe to the lungs, which are generally found inflamed and partially solidified. In the second form, the lining membranes of the intestines are generally inflamed and degenerated; the spleen or milt is nearly always enlarged, dark and soft; and the liver is generally diseased. Watery exudations in the belly and chest are also very common.

Treatment.—Dr. H. J. Detmers, of Missouri, who has made a careful study of this disease, expresses the opinion that a great many sick animals can be saved by proper medical treatment.

To accomplish this desirable result they must be separated from the herd, and provided with a clean, dry and well ventilated resting place, where they can have pure air, clean water and good food. Each animal should take, as early in the disease as practicable, the following emetic:—

No. 447.	Powdered white hellebore,	15 to 20 grains.
	Milk,	½ pint.

Mix for a full-grown hog.

Any hog not desperately sick will readily take this. When this has acted, and a couple of hours have elapsed, give two or three grains of tartar emetic, if the disease is principally in the lungs; or the same amount of calomel, if it is in the bowels; administering the medicine on a piece of boiled potato. This should be repeated two or three times a day, for several days, or until a change for the better is witnessed.

Externally, the lungs, in the one form, and the abdomen, in

the other, is to be rubbed with the following blistering ointment, as soon as the feverish symptoms abate :—

No. 448.	Powdered cantharides,	1 oz.
	Olive oil,	4 oz.

Heat over a moderate fire, for half an hour.

If the first application fails to produce a good blister, apply it again the next day.

When convalescence begins, give from ten to twenty grains of the sulphate of iron every day for a few days ; and if the lungs have been much affected, add to the dose thirty or forty grains of carbonate of potash.

Of other modes of treatment than those spoken of above, that recommended by Prof. N. S. Townshend, of Ohio, should be mentioned. This careful observer recommends, when the attack commences with copious and dark discharges from the bowels, to give at once—

No. 449.	Podophyllin,	20 grains.
	Bicarbonate of soda,	2 drachms.

In a boiled potato, or in milk.

If constipation is present, he would give—

No. 450.	Castor oil,	1 oz.
	Oil of turpentine,	1 drachm.

In milk or gruel.

He believes that in many cases the function of the liver is suspended, and that thus the blood is poisoned by the retention of effete matters. These active purges are calculated to excite the organ into activity.

APOPLEXY AND STAGGERS.

The hog, especially when plethoric and well fed, is liable to congestion of the brain, which may pass into actual effusion or apoplexy.

In congestion only, which is popularly termed "staggers," the animal is dull and stupid, the eyes are red, the bowels

constipated and the pulse hard and quick. These symptoms may pass off, or may increase, leading to a period of excitement from increased pressure on the brain. The animal runs to and fro, often in a circle, hitting against objects, as if blind; the breathing is laborious, and he may fall down in an unconscious condition.

In other cases, the effusion on the brain, or the apoplectic stroke, takes place without these premonitory symptoms. The hog suddenly drops, as if struck on the head with a hammer, the limbs stiffen, the breathing is hard and snorting, and a froth exudes from the mouth.

In either case the treatment is by promptly dashing cold water over the animal, and especially pouring it from a height of eight or ten feet on the head. The bowels should be stimulated by an active purgative injection, as—

No. 451.	Sulphate of magnesia,	4 oz.
	Oil of turpentine,	2 drachms.
	Soap suds.	½ pint.

Mix, for an injection.

Bleeding may be performed from the ear, or from the jugular, if it can be reached. But it is of no great benefit; and cutting a slit to the skull, and rubbing the wound with salt, as well as liniments, blisters, etc., are all of no use whatever. The cold douche and the active injection are the remedies.

COUGHS, COLDS, QUINSY, AND INFLAMMATION OF THE LUNGS.

These associated diseases of the breathing organs are as common in the pig as in other domestic animals.

For snuffles, or catarrh in the head, little is needed but stabling in a clean, dry pen, and cleanliness. There is, however, a chronic form of nasal gleet, called in some parts of the country "blue nose," which is said to be incurable, contagious, and very similar to glanders in the horse. We

have never seen a case of this, and doubt its identity with glanders. The nose is said to thicken and become twisted, or out of shape, and the discharge from it to be bloody, or to become so on slight exertion. The owner would be on the safe side to destroy an animal thus diseased.

An ordinary cold in a hog is called, in some States, a "rising of the lights." There is no propriety, whatever, in bleeding and purging for it, and following with tartar emetic or calomel, as the common run of books advise. Let the animal be well housed and fed, mustard flour moistened and rubbed into the throat and chest, and a tonic of sulphate of iron given. If these do not bring about rapid improvement, an ounce of tar should be given daily, by putting it well back in the mouth, by means of a narrow wooden paddle.

When the inflammation extends to the lungs, causing pneumonia, the symptoms are: loss of appetite, quick and labored breathing, shivering and severe cough. This requires the same or greater care in stabling and diet; while, as a medicine, the following may be administered:—

No. 452. Nitrate of potash,
Bisulphite of soda, of each 2 drachms.
Mix, and give in a pint of gruel.

Mustard or a blister to the chest is also of service.

Quinsy, or Strangles.—The inflammation of the glands in the throat (the tonsils), known by these names, is quite common, and often fatal in hogs, through the rapid suffocation it causes.

The symptoms are: difficulty in breathing and swallowing, swelling under the neck and lower jaw, protrusion of the tongue, and slavering from the mouth.

The disease is usually so rapid that treatment is of little avail. A copious injection should be given at the outset (such as No. 451); the pig should be cast and firmly held, while a number of scarifications are made in the skin of the throat,

over the swelling, with a sharp-pointed knife, just deep enough to draw blood freely, and these should be fomented with cloths wrung out of hot water.

Internally, the most reliable remedy is turpentine. Give it in swill, if the hog can swallow, in doses of two teaspoonfuls in a bowl of gruel; or, if he cannot, fasten a feather to the end of a stick, dip it in a mixture of half turpentine and half oil, and with it swab the inside of the throat as far as can be conveniently reached.

DIARRHEAL DISEASES.

Scouring or diarrhea is an affection chiefly of quite young pigs, in the first week or two of life, and often proves fatal to them. Its cause is usually the bad quality of the sow's milk. This should be amended by giving her a change of diet, and avoiding dry and spoiled corn and musty food. The pen should be thoroughly cleaned and disinfected daily, as the odor of the diarrheal excrement tends to keep alive the disease.

The treatment must be largely directed to the sow. Her food should be changed, and she should be given the following:—

No. 453.	Fenugreek, powdered,		
	Aniseed, "	of each	2 lbs.
	Gentian, "		1 lb.
	Carbonate of soda,		2 oz.
	Chalk, powdered,		2 lbs.

Give a tablespoonful of this in the food, every time she is fed.

Coal ashes should be placed in the pen, for the pigs to root in. Oats, wheat and barley, ground together, make an excellent food for the sow at this time. Charcoal and salt, in small quantities, may be given.

AGUE CAKE—MILT SWELLING—SPLENITIS.

Like cattle, hogs which live in swampy, malarious districts are quite liable to an enlargement of the spleen or milt, and a failure to fatten, in consequence of it. It is also believed to be brought on at times by over-feeding, with little or no exercise, as in the case of "show" pigs. In France this disease is called *"la ratille,"* and has received considerable attention, as it so often interferes with the fattening of hogs for market. In itself, it is not often, or at all, productive of fatal consequences.

Symptoms.—There is a perceptible loss of condition; the pig eats, but his food "does him no good," as the breeders say; his appetite is rather capricious and irregular; he is dull and languid. When further advanced, he is noticed to lie nearly or quite always on one side, and in walking leans toward one side, sometimes cringing and bending over, as if the erect position gave internal pain.

Treatment.—This should begin with a brisk purge. Twenty grains of podophyllin, or ten of jalap and ten of calomel, may be enclosed in a boiled potato, and given fasting. The diet should be lowered, and when possible the animal put to graze on a dry upland. The French veterinarians praise highly, especially in cases where this complaint comes on while fattening, and interferes with that process, the following:—

No. 454. Wormwood leaves,
Liverwort " of each, ½ lb.
Boil slowly in a gallon of soft water, for half an hour.

This may be given in slop, in doses of half a pint to a pint daily. The liverwort is the *Hepatica triloba*, and is found in most parts of this country.

In preparing to fatten after an attack, it must be done

gradually ; and the special advice is given to feed at regular intervals, *and always remove whatever food is left from each meal.*

LEPROSY.

Under this name the French and English veterinarians have described a disease to which hogs are subject, especially in very hot seasons. Its tendency is fatal, and it is believed to be contagious. Owing to the absurd habit in this country of calling all epidemics among hogs by the name of "cholera," and the very superficial way in which the maladies of the animal have been studied, we cannot positively say whether this so-called leprosy has a foothold in the United States or not, but some descriptions have led us to think that it has.

Causes.—These are want of cleanliness, absence of fresh air and clean water, foul feeding, and general neglect of the animal's health ; a second cause is contagion from those already suffering.

Symptoms.—According to a learned French veterinarian, M. Dupray D' Emportes, one of the very earliest symptoms of this complaint is the formation of a small tumor or blister, like a stye, on the edge of the eye. Other such blisters appear soon, around the mouth, in the throat, under the jaws, and finally over the whole body. Great prostration accompanies the disease ; the head is held down ; the whole frame inclines toward the ground ; the animal moves unwillingly, and with pain ; food is refused, and loss of flesh is rapid. Death follows, from emaciation and exhaustion.

Any reader at all versed in medicine will see that these are not the symptoms of leprosy, but rather of some form of malignant pemphigus. But its exact determination we leave to those who have opportunities to observe it.

Treatment.—The treatment recommended is, to place the animal in a cool, clean, well ventilated stye, with plenty of fresh water for him to drink and bathe in. For a medicine,

No. 454.	Flour of sulphur.	½ oz.
	Nitrate of potash,	1 drachm.

Give in a bran mash, twice a day.

His skin should be cleaned with soap and water, and the sores dressed with tar ointment.

TRICHINOSIS.

The *Trichina spiralis* is a minute parasite that infests the flesh of several animals, especially the hog; and as it is very tenacious of life, it is, from eating pork, occasionally transferred to man, in whom it produces serious and sometimes fatal illness.

The trichina is said to be not uncommon in American pork, and in several European markets our exportations of this staple have met with less favor on this account; but the facts are that German pork is quite as much infected as our own.

The trichina is believed to inhabit the body of animals at all stages of its existence; and hence swine fed exclusively on vegetable diet are not liable to them; while, on the other hand, those permitted to eat the offal from slaughter houses, carron, rats, mice and decaying animal matter generally, are usually more or less infected with trichina, and form a dangerous article of food for the table.

The trichina is exceedingly small, about the twelfth or fifteenth of an inch in length, and in its miniature state lives in minute cysts in the muscles. They increase with amazing rapidity, several hundred thousand congregating in an ounce of flesh; and when thus numerous, they give rise in man to symptoms closely resembling those of typhoid fever. The mature worm escapes into the intestine, where they pair, the

female bringing forth a numerous brood of larvæ, who find their way to the muscles.

The hog does not appear to suffer from the trichina; and its presence in his body can therefore only be ascertained by a microscopic examination of the flesh.

No remedy has been discovered capable of destroying trichinæ, when once encysted in the muscles. The free administration of ergot has the most to be said in its favor. But as the trichinæ are effectually killed by thorough cooking, it is a prudent precaution to insist that pork, in all its forms, when served for food, should be thoroughly *well done*.

HYDATIDS OF THE KIDNEYS—KIDNEY WORMS—LARD WORMS.

The kidneys of hogs, and the fat which surrounds them, are liable to become the home of various parasites.

One of the most frequent of these is the lard-worm, *Stephanurus dentatus*, which is an inch or an inch and a half in length, and inhabits by preference the fat about the spare ribs, but is found in all parts of the body of swine. It is, however, more a curiosity than a subject for medical treatment, as it is not known that it causes any serious symptoms in the animal.

The kidney itself has been known to be inhabited by a larger worm, of similar appearance, called the *Eustrongylus gigas*. It is not found in the substance of the kidney itself, but in the pelvis or hollow curved portion in which the secretion of urine takes place. Various symptoms are popularly attributed to "kidney worms," especially a weakness or partial palsy of the hinder limbs, inclination to lie down, and awkwardness in the gait. The cure is said to be to pour a tablespoonful of turpentine across the loins or small of the back daily, for several days. It is quite uncertain, however, that in such cases there is any worm present,

as we have no positive symptoms of its existence in the kidney.

Of a much more serious character are hydatids or bladder worms in the kidneys. These differ from those shortly to be described as causing "measly" pork, being much larger, and of unknown development. A number of cases are recorded by Prof. N. S. Townshend, in the Annual Reports of the Ohio Agricultural Society, for 1875, where the sudden death of hogs, with few and obscure symptoms, was found to be owing to the presence of these parasites. They were from one to one and a half inches in diameter, and the kidney and bladder contained blood. If it were possible to ascertain their existence in the kidney, steady, moderate doses of turpentine would be the most promising treatment. Perhaps the altered character of the urine which Prof. Townshend notes, would have led a closer observer than the farmer who owned the pigs to a suspicion of the nature of the complaint.

MEASLES.

The name "measles" has been given to a parasitic disease of swine, not that it resembles in the most remote degree the familiar malady known in the human species by that name, but because the flesh of hogs so affected bears a fancied resemblance to the human skin with the eruption of measles on it.

This appearance of pork is owing to the presence of numerous small cysts, about the size of a grain of barley, scattered through the muscular and other tissues. These cysts, when closely examined, are found to contain a small worm, called the bladder worm, folded up in a coil, and composed of numerous segments, each of which segments is, in fact, an independent individual. What is more remarkable is that the minute worm is nothing else than the miniature form of that redoubtable occasional inhabitant of the human intes-

tines, *the tapeworm.* When measly pork is eaten, not sufficiently cooked to destroy these parasites, one or more of them develops in the human bowels into a row of creatures, commonly believed to be one worm, often ten, twenty or thirty feet in length.

The cysts do not seem materially to injure the hog during life, though their presence can occasionally be detected by examining the lining membrane of the eye, or that under the tongue. In most if not all cases the animal swallows the eggs, which develop into cysts, by feeding on human excrement, or on pastures where this excrement has been used for manure. As this is the evident means of the propagation of the parasite, the preventive measures demanded are self-evident.

The symptoms which are attributed to measles are a cough, discharge from the nose, running from the eyes, weakness of the hind legs, and general debility. On the skin there will be found a number of small watery pustules of a reddish color. The treatment recommended is to give small doses of sulphur and saltpetre, daily for several weeks together with a liberal supply of wholesome, nutritious, and easily-digested food.

THE MANGE, ITCH, OR SCAB.

In spite of their generally filthy habits, this is a less serious disease in pigs than in sheep (see page 383). True mange in them is caused by the presence of the *Sarcoptes suis.* It is transmissible to man, and for that reason, as well as for the annoyance it gives the hog, it should be removed without delay.

This can be successfully accomplished by first soaping the animal well with soft soap, and after this has been on an hour or so, washing it off with warm water. After he has dried, one of the following ointments should be rubbed in :--

No. 455.	Flowers of sulphur,	4 oz.
	Oil of turpentine,	1 oz.
	Lard,	8 oz.

Mix thoroughly.

Or :

No. 456.	Powdered stavesacre,	2 oz.
	Olive oil,	1 oz.
	Lard,	8 oz.

Mix together.

Or the following wash :—

No. 457.	Flowers of sulphur,	2 lbs.
	Quick lime,	1 lb.
	Water,	2 gallons.

Boil together, stirring continually, until the ingredients are combined.

Mr. H. D. Richardson, in his treatise on *Domestic Pigs*, says he has never known any case of mange, however obstinate, that would not yield to the following treatment: He washes the animal with soft soap and warm water, dries it, and then applies this ointment :—

No 458.	Train oil	1 pint
	Oil of tar	
	Oil of turpentine, of each	2 drachms.
	Petroleum	1 drachm.

Mix with sufficient flour of sulphur to make a thick paste.

Rub the animal with this mixture and let it remain on his skin for three days. On the fourth day wash it off with strong soap suds or soda water, dry him and change his bedding. Internally, let him have in his food, for a fortnight from the time the treatment commences, the following powder :—

No 459.	Flour of sulphur	½ oz.
	Nitrate of potash	1 drachm.

Mix for a powder.

LICE.

These disgusting parasites abound on ill-fed and half-sick hogs. Indeed, their presence may almost be said to be a sign that the animal is out of condition. It is not suffi-

cient, therefore, to destroy them with an insecticide; if the cure is expected to be permanent, the animal must be kept clean, well fed, and supported with tonics, such as sulphate of iron, if occasion demand it.

As a safe and efficient ointment to kill lice we may use scotch snuff, rubbed up with lard; or the following:—

No. 460.	Stavesacre seeds	4 oz.
	White hellebore	1 oz.
	Water	1 gallon.

Boil to two quarts, and apply with a brush where lice are seen.

Kerosene is also very destructive to lice, and may be freely sponged over the animal.

PART IV.

Hygiene and Medicines.

CHAPTER I.

THE HYGIENE OF DOMESTIC ANIMALS.

Hygiene of the Horse. Food—Drink—Cleaning—Ventilation—"Condition Powders."
Disinfection—Receipts for Disinfectants.
Hygienic Rules in the Fattening of Animals.
"Cattle Powders," and "Condimental Foods."
Diets for Fattening.

The purposes for which domestic animals are kept differ widely when we consider the horse on the one hand, and on the other the steer, cow, sheep and hog. The former is prized for its capacities for speed and transportation only; the latter chiefly as they furnish food to man. Hence, the hygienic treatment of the two classes materially differ. It is alike, however, in this respect, that is, that it is designed in both cases to obtain, at the least outlay of care and money,

the utmost fitness for the purpose for which the animal is kept.

HYGIENE OF THE HORSE.

Food.—The hygiene of the horse has reference first to his food. As we have previously mentioned, the horse has but one stomach, and that not at all a large one for his size. Hence he requires food in moderate quantity, but frequently, at least every four or five hours. In regard to quality, he is best suited by a mixed diet of grain and hay. In proportion as the work demanded of him is arduous the proportion of the grain (whether corn, oats, peas or beans) should be increased; whereas, when the work is not severe, and when, as in private carriage horses, it is desirable that they should present a roundness and plumpness of form, it is necessary to diminish the amount of grain, or otherwise the animal becomes plethoric, and "out of condition."

Attention must also be given, in this respect, to the individual constitution of the horse. Some animals are said to be more "easily kept" than others. This usually depends on the greater perfection of their digestive organs. They assimilate all the nutriment there is in their food; while a horse which is "hard to keep" will generally be found to pass with his evacuations a considerable percentage of undigested aliment. A remedy for the latter condition will often be found in selecting food of a rather constipating character, giving it well ground, so that the digestive fluids will act on it easily, keeping the teeth in good repair, allowing but a moderate quantity of water, and if called for, by administering a light tonic. A very important point in such cases is to keep the skin active, by brushing, washing and clipping.

Those who would raise a fine breed of horses should pay especial attention to the food of mares during pregnancy. Messrs. Seller & Stephens, in their excellent treatise on

The Physiology of the Farm, lay it down as a well established fact that any, even a temporary, failure in the quantity or quality of the food of the dam at this period will surely prove the source of some one or another defect of the foal, and perhaps lay the foundation for some serious vice of the constitution, which may affect its value throughout life. The food should not be rich, nor fattening, as a condition of plethora or obesity is always injurious to the fetus; yet the nourishment should be somewhat more abundant than in the ordinary condition. Moderately rich pastures, fairly set in any of the better class of grasses in summer, and clean, well cured hay, with medium quantities of grain in winter, should be the diet of the pregnant mare.

Drink.—The average horse varies in the amount of water he will consume daily, from two buckets to five or six. It should be given at regular intervals and those not far apart. Three times a day is not frequently enough. Double that frequency would be more correct. When the horse is in active use he should not be allowed to drink to repletion at any time, except in the evening, after the day's work is done, and when the hide has cooled to the ordinary temperature.

The water selected should be pure, soft, and cool. Hard water, however, agrees well with horses which are accustomed to it, and their bowels are as apt to be disturbed on changing to soft water as are those of animals accustomed to the latter when first placed upon that which is hard. Especial care should be taken that the water does not contain decaying animal or vegetable matter. Various instances have been reported where whole stables have been sickened by water containing these organic impurities.

Cleaning.—All horses are better for cleanliness, both as respects their stables and their coats. When well groomed, the secretion of the skin is more active, and the internal organs are not nearly so liable to congestion. An exception to this is

made by some horsemen, when a horse has been driven through muddy roads. It appears that it is better to allow the mud to dry on his coat before removing it, and then not comb or wash it off, but remove it by brushing only; otherwise the skin is liable to crack. (See page 211).

Ventilation.—In many stables, especially in cities, there is great neglect of proper ventilation. The air in the stalls in the morning is close, hot and foul. Consequently, the animals easily take colds and sore throats, and recover slowly. Fresh and pure air is one of the greatest safeguards to the health of the lower animals, as of man, and often attention to this alone will do away with the need of tonics and condition powders. It is unnecessary to enter into the various details of ventilation, as their excellence often depends upon the structure and position of the particular building.

"CONDITION POWDERS."

Under this name large quantities of secret preparations are sold throughout the country, the avowed object of which is to restore to vigor horses which are "out of condition," and to increase the appetite and fattening capacities of stall-fed steers, sheep, etc. The great majority of these powders do more harm than good. They are composed of stimulating and heating substances, and indiscreetly administered, by persons ignorant of their composition, they often give for a time a fallacious appearance of health and vigor to the animal, followed by prostration and disease. We warn against their use, and will here give simple and efficient substitutes for them, which can be bought at much less cost.

But, first, let us inquire what we mean by saying that an animal is "out of condition?" The term is applied to two very different states of the system.

One, and the more common, is where the animal has been well fed and cared for, and is sleek and seemingly robust.

But he becomes capricious about his food, the appetite is variable and generally lessened, the eye is dull, and sometimes yellowish and bloodshot, the motions languid, there is an absence of "fire," the bowels are bound, the dung dry, the temper is irritable, and there is a general want of "tone." Now, this is nothing else than what medical men call a state of "plethora;" there is a formation of superfluous blood and fat, owing to a too rich and abundant diet, and an insufficiency of exercise and pure air. Usually medicine of any kind is superfluous. If the diet is changed to a poorer one, and diminished in quantity, and if abundance of exercise is given, these symptoms will soon pass away. If they do not, small doses of aloes (2 to 4 oz.) should be given twice a week; and an ounce of saltpetre placed in the water about as often. These agents act on the bowels and kidneys, and will soon relieve the overloaded system.

The second form of loss of condition is seen in hard-worked and often underfed horses. The coat is rough and staring, the skin dry and harsh, often hide-bound, the bowels are irregular, and the strength diminished. Even good care and food may fail to bring back the vigor and spirit of the animal. What now is to be done? The treatment is suggested by the cause of this impairment of the health. Nearly always it is a form of indigestion. The secretory organs must first be restored to activity. The coat should be brushed, clipped and washed; an ounce of saltpetre should be given every other day, in a mash, to excite the kidneys; the bowels cleaned out with a moderate dose of aloes; and soft, easily digested food given. If this does not bring the animal to condition in a fortnight, then we should have recourse to that wonderful tonic for the equine race, *arsenic*.

This powerful drug has been greatly abused in veterinary medicine; but it is of the utmost value in many cases, and this is one of them. It may be given in one-ounce doses of

Fowler's solution of arsenic, every other day; or, in many instances, it works still more efficaciously if combined with iodide of potash—

No. 461.	Fowler's solution of arsenic,	½ oz.
	Iodide of potash,	½ oz.
	Water,	1 pint.

Mix into a draught, with water or gruel.

Of the various condition powders which have been recommended, many are hurtful, on account of the warm and bitter tonics they contain. Scientific practitioners do not approve of these additions, and they should be avoided with especial care when the animal is changing its coat. At times, as stimulants to the general functions, we may use one of the following; but none of them should be continued for a length of time, nor repeated very frequently:—

No. 462.	Flowers of sulphur.	
	Cream of tartar,	
	Saltpetre, of each	¼ oz.

Mix, and give in the food.

No. 463.	Black antimony,	½ lb.
	Flowers of sulphur,	2 lbs.
	Common salt,	1 lb.
	Powdered liquorice,	½ lb.
	Fenugreek,	¼ lb.

Mix. Give a tablespoonful every day or two. This is an old formula, and an example of a kind which has been much overpraised. Black antimony is an uncertain, coarse drug, not at all deserving of its reputation in veterinary medicine.

No. 464.	Sulphurated antimony,	1 oz.
	Nitrate of potash,	8 oz.
	Flowers of sulphur,	12 oz.

Mix, and give a tablespoonful every 2 or 3 days. This antimonial preparation is superior to the one above given.

Other materials of local popularity in the stable are numerous. In Eastern Pennsylvania, one of the most prized is the Virginia snakeroot (*Aristolochia serpentaria*), a tonic and stimulant indigenous vegetable, often used as a household remedy. A cold infusion is prepared by steeping a

handful in a quart of water, and a tumblerful is poured over the grain or hay once a day.

Another favorite is willow bark. The inner bark of the young shoots is boiled in the proportion of a handful to the quart of water, and a tumblerful of this administered daily. As the willow bark contains the bitter principle known as *salicin*, which is an excellent tonic and appetizer, no doubt this is an efficient plan to correct dull and drooping horses.

In the army *gunpowder* had the reputation of being a powerful stimulant for horse flesh, and occasionally we have heard of a spoonful being mixed with the forage, to instill life into broken-down nags. As all the materials of which it is composed, the nitre, the charcoal and the sulphur, are well known and often-used stimulants and correctives in veterinary medicine, their combination may, very likely, have a happy effect. It is recommended to mix the gunpowder with the whites of several eggs, and give it as a drench.

Whichever of these tonics is used, it should not be often repeated, as such a course will surely bring about obstinate dyspeptic troubles, and general deterioration of the health.

DISINFECTION.

For the prevention of diseases, especially for checking the spread of epidemic diseases, no measure is more important than thorough disinfection. Every stable, every farm, should have in store, and freely use, some disinfecting mixture. It should be constantly employed as a preventive of disease, as a purifier of the air and of the discharges, and often as a means of keeping away flies and insects. We give below the formulas of a number of the most efficient and *cheap* disinfectants, so that the reader can buy the materials and make the mixtures himself, and thus save the increased cost he would have to pay by buying them ready made.

It has been found by experience that no one substance acts so effectually by itself as it does in combination or solution. The following are in the solid form of powders :—

No. 465.	Copperas (sulphate of iron),	300 parts.
	Plaster-of-Paris, ground,	100 parts.
	Carbolic acid,	2 parts.

Mix well together.

No. 466.	Copperas,	20 parts.
	White vitriol,	1 part.
	Plaster-of-Paris,	36 parts.

Mix.

No. 467.	Copperas,	6 lbs.
	Common salt,	4 lbs.
	Flowers of sulphur,	2 lbs.

Mix. This costs about 14 cents per pound. It has been sold as the Excelsior disinfectant.

No. 468.	Air-slacked lime,	1 bushel.
	Copperas,	1 lb.
	Carbolic acid,	½ lb.

Mix. This has been sold as "carbolate of lime." It costs about 50 cents a bushel.

The following are in the liquid form :—

No. 469.	Chloride of aluminum,	1½ lbs.
	Water,	1 gallon.

Dissolve. This is known as "chloralum," and was introduced by Prof. Gamgee. It is not poisonous, and has no smell. The cost is about 50 cents.

No. 470.	White vitriol (zinc sulphate)	1 oz.
	Carbolic acid,	½ oz.
	Water.	1 gallon.

Mix. A cheap and efficient disinfecting wash.

No. 471.	Sulphate of iron,	16 oz.
	Chloride of zinc,	8 oz.
	Water,	1 gallon.

Dissolve. This is a powerful disinfectant. Cost about $1.00 per gallon. A pint of it, mixed with a gallon of water, is abundantly strong enough. It is poisonous.

HYGIENIC RULES FOR THE FATTENING OF ANIMALS.

The farmer and stock raiser will economize his food supply, and have his stock ready for market sooner, by paying attention to the physiology of the fattening process and the chemistry of food. It is not a part of our present task to enter into a discussion of these questions, but there are certain points relating to the preservation of the health of animals at such times which we shall touch upon, and which it is of essential importance for stock owners to consider.

Regularity in the hours of giving food is one of the secrets of success in economically fattening animals. The digestive organs become accustomed to doing their work at recurrent intervals, and they enjoy a period of repose between these periods, which fits them the better to perform their function when called upon. The English rule in fattening oxen is to feed four times a day, usually at 7, 10, 2 and 6 o'clock.

Regularity in the *quantity* of food is another secret. About the same amount of labor should be demanded of the stomach at each daily period of feeding. To fatten an ox, the English estimate is, that he requires, at first, five, and later four per cent. of his weight of cured hay or mixed food per day. This amount should be divided equally in four meals.

Abundance of fresh air and moderate exercise should not be neglected. We are aware that many of the farmers of the Eastern States, celebrated for their stall-fed cattle, chain them in dark stalls for months at a time, without paying any attention to the precepts we speak of. It is also true that, thus shut up, the animals lay on fat faster than they would if allowed the range of the barn yard. But it is also a fact that experience has over and over proven that such animals are peculiarly liable to fatal contagious disorders, and the extra less so entailed will more than counterbalance, in the long run, the food economized by this plan.

The wisest of all systems of fattening is by keeping the animals in what the English call *hammels*, that is, small pens to accommodate two oxen, one-half of which is roofed and walled, so as to afford entire protection from inclement weather, while the other half is open. The animals are thus in a measure isolated from contagion; they have abundance of fresh and pure air; and while they have just enough room to obtain this, they are sufficiently confined to prevent them wasting their fat in running.

When, through stall feeding, an animal becomes plethoric, loses his appetite, and the food taken does not increase the weight as it should, it is well to change the character of the food to a plainer kind, for two or three days, and give an alterative powder, as—

No. 472. Nitrate of potash,
Sulphur, in powder,
Ginger, of each, 2 oz.
Mix. Give in molasses and water. For a steer.

When the appetite improves, small quantities of food, at regular intervals, should be offered, and if any is left in the manger, it should at once be removed.

CATTLE POWDERS AND CONDIMENTAL FOOD.

Various "cattle powders" and "fattening powders" are sold throughout the country, claiming to increase the deposit of fat in animals, and thus economize the food supply.

They are always composed of much the same materials, variously disguised, to wit: of some of the stomachic and carminative seeds—aniseed, carraway seed, fennel seed, coriander seed, ginger or mustard seed; of some vegetable tonic—as gentian, Virginia snake root, willow bark, cascarilla, etc.; of one or more of the alteratives—sulphur, nitrate of potash, common salt, etc.; and perhaps of a mineral tonic, as copperas; the whole colored with turmeric and mixed with meal. As the fla-

vor is agreeable to cattle, they eat their food with more eagerness when thus spiced, and the compound seems to restore their appetite when it has been failing. The tonics and alteratives may also act, occasionally, favorably on the system; but, as we have previously urged, the habitual use of any such mixtures will entail unfortunate results on the health of the stock.

In England fortunes have been made by selling what are called "condimental foods." These are ground feeds of various kinds, to which palatable and stimulating substances have been added. Horses, cattle and sheep consume them greedily; and added to their ordinary provender from time to time, their use is no doubt often productive of benefit; but by no means to the extent that the exaggerations of their advertisers would have us believe. The general composition of these foods may be seen from the following receipt, which is given by Dr. Charles A. Cameron, in his *Stock Feeder's Manual*, as making a mixture equal, if not superior, to any secret combination for the purpose there is in the market. The quantities given make one ton :—

No. 473.		
	Linseed meal,	800 lbs.
	Ground beans,	925 "
	Indian corn meal,	433 "
	Powdered turmeric,	30 "
	" ginger,	3 "
	" fenugreek,	2 "
	" gentian,	10 "
	" coriander seed,	2 "
	Cream of tartar,	20 "
	Flowers of sulphur,	10 "
	Common salt,	5 "
		2240 "

DIETS FOR FATTENING.

The direct use of fats and oils has been found, in England, to be a great aid to the speedy and economical fattening of animals. An ounce of fish oil, daily, to a sheep or pig, or a half pint to a steer, will increase the accumulation of fat so

rapidly that the cost of the substance is much more than returned to the owner. Probably any of the mild fixed oils, as linseed, lard, or cotton seed oil, will answer as well, and as in some sections they are very cheap, the use of them should be encouraged. Oil cake is an excellent fattening material. As a healthful and typical fattening mixture for the ox, Messrs. Lawes and Gilbert recommend the following :—

No. 474.	Crushed oil cake,	8 lbs.
	Chopped clover hay,	13 lbs.
	Turnips,	47 lbs.

This amount is given daily, in four divided portions, to an ox weighing about fourteen hundred pounds, and will increase him in weight at the rate of twenty pounds per week.

In feeding Indian corn or peas it is important to give pigs a supply of some mineral substance, the grain not containing sufficient for keeping them in a healthy condition. Their breathing becomes labored, and they become "bloated," with occasionally local swellings of the glands at the sides of the neck. For this, Mr. Harris recommends that a trough containing the following mixture be placed in the pen, and the pigs be allowed to take it as they wish :—

No. 475.	Finely-sifted coal ashes,	20 lbs.
	Common salt,	4 lbs.
	Superphosphate of lime,	1 lb.

In all cases they should have an abundance of pure water to drink, be kept clean by washing and change of litter, weekly, and have a stye with a tight roof, to protect them from the sun and storms. Instead of a mud hole to wallow in, there should be a heap of dry coal ashes, charcoal, or clean, dry earth, in one corner of the pen. This will keep them free from lice and fleas.

A frequent mistake is in giving too much food at once. Double the quantity of food is often required to fatten an animal, when it is given irregularly, and in large quantities. Small amounts at regular intervals are far more economical.

CHAPTER II.

POISONS AND THE TREATMENT OF POISONING.

General Rules for the Treatment of Poisoning.
Vegetable Poisons:—Aloes—Castor and Croton Seeds—Diseased and Spoiled Foods—Eupatorium—Hellebore—Laurel—Poisonous Mushroooms—Opium—Ranunculus—Sarin—St. John's Wort—Tobacco—Turpentine—Stramonium.
Mineral and Chemical Poisons:—Acids—Alkalies—Alcohol—Arsenic—Brine—Corrosive Sublimate—Creasote—Lead—Mercury—Strychnine—Tartar Emetic.

Cases of poisoning in the lower animals are usually owing to accident, in forcing down excessive doses of dangerous drugs as medicine; or design, when an enemy seeks to revenge himself on the owner by poisoning his stock; or to animals consuming with their food some noxious plant or other injurious agent.

Often, especially in the second and third of these cases, it is not known really what poison has been taken. In these, and, in fact, in nearly all cases of poisoning, it is safe practice to act at once, in accordance with the following rules:—

1. Administer at once a full dose (one to three pints) of some bland oil, as sweet, cottonseed, lard, or linseed oil.

2. Follow the oil with repeated doses of lime water, or powdered chalk, whiting, or powdered charcoal, mixed with water or mucilage to the consistency of thin syrup.

3. If great exhaustion and sinking follow, and signs of drowsiness, without inflammation of the stomach, give whisky or other spirits freely.

4. Move the bowels by active injections (as No. 91.)

For purposes of treatment, poisons may be most conveniently divided into Vegetable Poisons and Mineral and Chemical Poisons.

VEGETABLE POISONS.

Aloes.—The extensive use of this strong purgative in veterinary practice has led to many cases where animals have died from its effects. The symptoms are those of excessive purging. The feces become scanty, bloody, and expelled with violent straining. The pulse is rapid, the legs and ears cold, the mouth hot and dry, and the belly bloated and painful.

The treatment consists in giving a full dose of opium, say two ounces of laudanum in a quart of linseed tea, repeating it in two hours if necessary; and throwing a like quantity up the rectum.

Castor Seeds; Croton Seeds.—Both these seeds act as purgatives on the horse and ox, and swallowed in large quantities bring about violent and dangerous action of the bowels. The treatment is the same as directed under Aloes.

Diseased and Injured Foods.—Foods which have been "spoiled," or have undergone fermentation and partial decay, are liable to bring on attacks of diarrhea, inflammation of the stomach and bowels, obstinate constipation, and other symptoms. Among these musty and sunburnt hay is a common cause of colic, dyspepsia and stomach staggers. The animal loses flesh and strength, the eye is yellow, the urine dark, and violent attacks of giddiness, and even frenzy may supervene. To relieve these symptoms, full doses of purgatives should be given by the mouth and rectum, the diet changed, and the strength supported by tonics and stimulants.

Mouldy oats are liable to produce diabetes or profuse staleing. The symptoms and treatment of this complaint are given on page 164.

Straw which is rusty has an injurious effect on animals, rendering them thin and sickly, subject to epidemic diseases, and lessening their vigor.

The fungus growth called *ergot* is found chiefly in rye and Indian corn. The consumption of such grain in quantities, for a long time, is very sure to bring on injurious results. The animals have ragged coats, their teeth loosen, they lose flesh, and are peculiarly liable to fatal impaction of the third stomach, as we have mentioned on a previous page (216), where we referred to a very severe epidemic that prevailed in the Mississippi Valley some years ago, and which was distinctly traced to this cause. The usual symptoms of the condition known as ergotism are a dull, stupid expression, staring look, dilated pupils of the eyes, staggers and stupidity; with these are twitchings and spasms, especially of the muscles of the hind limbs, passing into palsy. The temperature, as felt on the horns, ears and legs, is below the normal,

the pulse is slow and weak; sores are slow in healing; and there may be a discharge from the nose.

Half rotten turnips and cabbages, and potatoes which have the blight or rot, should not be fed to stock. Their nutritive power is lost, and not unfrequently they bring on colic and diarrhea.

Eupatorium.—The white snakeroot has been alleged to be the cause of milk sickness or trembles. But, as we have said in discussing that disease (page 304), the evidence to this effect is insufficient.

Hellebore.—White Hellebore, or Indian Poke (*Veratrum album*), grows over large sections of the United States. It is an active, narcotic, irritant poison, especially the root, and instances of poisoning from it have been reported. The treatment is by full doses of whiskey, by which means the symptoms will be promptly dispersed.

Laurel.—The sheep's laurel (*Kalmia angustifolia*) is believed to be poisonous to sheep when they eat its leaves, berries or branches. The plant grows abundantly in the Middle States. The poisonous principle which it contains is allied to prussic acid. The proper treatment of poisoning by this means is to administer stimulants, as whisky or gin, freely, and promote the action of the bowels, by purges and injections.

Mushrooms.—The poisonous species of mushrooms seem to be avoided by the lower animals. Yet some instances of fatal results from their consumption have been known. The antidotes used are oil, stimulants and solution of ammonia.

Opium.—The extensive use of this vegetable product in medicine has led to frequent cases of poisoning from it. It requires, indeed, considerable quantities. From one to two ounces prove poisonous to the horse, but cattle can sustain several times this amount. The symptoms from opium poisoning are, in the first stage—restless twitching of the ears and tail, hot extremities, quick and full pulse, rapid breathing: in the second stage, which comes on after one or two hours, there are —giddiness and sleepiness, an unsteady gait, red eyes, partial palsy, cold sweats, and gradual sinking into stupor or convulsions. For the treatment of such cases, very strong coffee should be given, for a drench, a pint at a time, with a gill of whisky, and repeated at short intervals. The animal should be kept in active motion, and if these measures promise to fail, atropia, the natural antidote of opium, should be injected beneath the skin. Cold water, poured on the head from a height of ten or twelve feet, for ten or fifteen minutes at a time, is an effectual means of dispelling the sleepiness which comes from opium.

Ranunculus.—All the varieties of Ranunculus are acrid and irritating. The celery-leaved crowfoot, *Ranunculus sceleratus*, has a bad reputation in this country, as poisonous to sheep and other stock, when eaten by them. The eyes of the animals roll, the breathing becomes laborious, they are giddy, turn round and round, and may drop suddenly dead. At other times, loss of appetite, quick pulse, staring coat, and the other symptoms of acute inflammation of the bowels follow its use. In the latter class of cases a full purge of linseed and castor oil is required; in the former, an ounce of ether, in milk, will often dissipate the nervous symptoms, and give time for an active purge to carry off the offending substance.

Savin.—The oil and powder of savin are largely and sometimes indiscreetly, used in domestic veterinary pharmacy. When given in excessive doses, they give rise to severe colic, loss of appetite, fever, and constipation, followed by a bloody and exhausting diarrhea. The treatment is to administer full doses of sweet or linseed oil, with one to three ounces of laudanum, and support the strength by doses of an ounce of ether in a pint of milk.

St. John's Wort.—This common weed, the *Hypericum perforatum*, is charged, and probably justly, with irritating and producing sores on horses, cattle and sheep, especially such as have white feet and noses—the skin of such being more tender and irritable. Dr. William Darlington, the late eminent botanist of Pennsylvania, says: "The dew which collects on the plant seems to become acrid. I have seen the backs of white cows covered with sores, wherever the bushy ends of their tails had been applied, after draggling through the St. John's wort." The noses of sheep are often found to be sore, from this cause. The treatment is to wash the sores clean, and cover them with wood tar or petroleum, which heals and counteracts the acridity of the plant.

Stramonium.—The Jimson or Jamestown weed is a common plant in the Atlantic states, and, in fact, in all quarters of the world—along roadsides, on dung heaps, etc. It is a narcotic and irritant poison, although the herbivora can take considerable quantities of it without serious results. Two pounds and a half of the seeds have been known to kill a horse. The symptoms are giddiness, faintness and delirium, followed by convulsions, palsy and stupor. The stomach and intestines are inflamed, the bowels constipated or passing bloody feces, and the colic is severe. The treatment is by full doses of sweet or linseed oil, containing two to four ounces of laudanum, injections, and supporting the strength by ether or whisky.

Tobacco.—Horses and oxen will eat green tobacco without suffering from it; but six pounds of cured tobacco have been known to kill a cow. Goats, on the other hand, have been seen to eat cigars and dried tobacco leaves with apparent enjoyment. The poisonous results are manifested in herbivorous animals by violent purgation, with very offensive feces, pain in the belly and wind colic. The pulse is weak, the coat staring, the extremities cold. There is great prostration, foaming at the mouth, and convulsions or stupor. The treatment is, to administer active purgatives, followed by full doses of whisky, in slippery elm bark mucilage, or linseed tea.

Turpentine.—The chief injurious effect of turpentine is upon the kidneys, in producing strangury. The proper treatment has been considered on page 162.

MINERAL AND CHEMICAL POISONS.

Acids.—The so-called mineral acids—sulphuric, nitric and muriatic acids, and the concentrated vegetable acids, are all caustic and irritant poisons. They would never be taken willingly by an animal, but may be forced down, through ignorance, error or design. Their antidotes are full doses of alkalies, such as powdered chalk, whiting or lime water. These should be promptly administered, and followed by sweet or linseed oil.

Alkalies.—Quick lime, caustic potash, concentrated lye, washing soda, etc., are destructive agents to the tissues. When taken internally, they must be counteracted by acids, the handiest of which is usually vinegar and water. This should be freely taken, and followed by a purge of oil.

Alcohol.—Half a pint of pure alcohol will kill a horse, as experiments have demonstrated; but of the commercial article much larger doses can be tolerated. A form of chronic alcoholic poisoning has been noticed in horses which have frequently been dosed with whisky to keep up their strength. The only treatment needed is to suspend the use of the agent.

Arsenic.—From the extensive use made of this drug in veterinary pharmacy, instances of poisoning by it are not uncommon. Forty grains of it in solution is a fatal dose for a horse. Both horses, sheep and cattle have been killed in numbers, from pasturing in a field over which sheep had been allowed to run just after being dipped in an arsenical solution. The symptoms are: violent pain in the bowels, purging and straining; intense thirst, quick, feeble pulse, irregular

breathing; reddish urine, low temperature, faintness, palsy, convulsions, and death. Sometimes a frothy mucus comes from the mouth and nose, the eyes are jaundiced and the skin discolored. The treatment for herbivorous animals is to give full doses of oily purgatives. With these may be joined several spoonfuls of iron rust, which forms with the arsenic a harmless salt. The carbonate of iron is a more active form.

Brine.—It is not generally known that a formidable poison is developed in the brine in which flesh and fish are steeped, after standing a few months. About two quarts of such brine will kill a horse, and a pint and a half will destroy a pig or goat. The symptoms are sick stomach, giddiness and apoplexy; the jaws twitch and the animal foams at the mouth. Death may take place in eight hours. The treatment is by active purges and stimulants.

Corrosive Sublimate.—The corrosive chloride of mercury, commonly known as corrosive sublimate, is one of the most active and fatal poisons in veterinary pharmacy. It should always be used with the utmost caution. A quarter of an ounce of it will kill a horse or an ox, and half that amount will destroy a sheep or pig. The symptoms are: violent pain in the belly; intense thirst; total loss of appetite; diarrhea, with offensive and bloody discharges; cough; trembling, salivation, stupor and death. The treatment is to pour down the whites of a dozen eggs, stirred up with a little warm water; followed by linseed tea, mucilage of slippery elm bark, and a slop diet for some days.

Creasote.—This medicinal agent is actively corrosive and caustic. In cases of poisoning by it the general treatment advised on page 427 should be resorted to.

Lead.—Sugar of lead and litharge are both poisonous forms of this mineral. Lead poisoning is also common among horses and cattle in the vicinity of smelting works, where minute particles of lead, carried up the flues of the furnaces, are blown by the wind over the pastures, and taken up by the animals in eating the grass. The refuse of cities, when used as a fertilizer, generally contains pieces of sheet lead and painted articles which contaminate the pasturages, and produce chronic and fatal lead poisoning in the stock. The supply of water may also be charged with soluble salts of lead in passing through conducting pipes of that material, and lead to the same result.

The symptoms of lead poisoning are loss of appetite, staring coat, arched back, an anxious expression, with sometimes foaming at the mouth, and a protruding tongue. This is followed by staggers, which

may be dull and sleepy, but are more often of the mad variety, the animal running violently and blindly, dashing his head right and left, and wearing himself out in desperate and aimless courses. As a rule there are entire loss of appetite, and obstinate constipation. According to some the gums are of a gray or blue color, owing to a deposit of lead under the membrane.

The treatment should be a large dose of a purgative, in cattle and sheep either Epsom or Glauber salts, aided by a large, stimulating injection in the rectum. When this has well acted, an ounce or two of iodide of potash, every day, for a week, will counteract the effect of the lead yet in the system.

Mercury.—We have already spoken of the corrosive chloride of mercury under Corrosive Sublimate. Calomel may also be given with poisonous effects, especially if it is frequently repeated. The animal is salivated, and a diarrhea sets in which cannot be checked, and the creature dies, from prostration and low fever. Blue ointment, unguentum, or mercurial ointment, is in some sections very much used for scab, and to destroy lice and ticks. Many thousands of sheep have been destroyed, or seriously injured by this dangerous and needless remedy. Death often occurs about the eighth or ninth day after the ointment has been applied. The symptoms are of suffocation and congestion of the lungs, sometimes with salivation, loosening of the teeth, loss of appetite, and diarrhea. The treatment of such a condition is the preventive one of using some innocent insecticide, a number of which we have given in the appropriate place.

Strychnine.—This potent and rapid poison is also a valuable medicine, but must be administered cautiously. Ten grains are more than enough to kill a horse. The symptoms produced are: violent agitation and trembling; stiffness and jerking of the limbs; violent general spasms, the limbs rigid, the back bent, the respiration checked; intervals of rest occur, but a slight noise, or touching the animal, will excite the fits again. Paroxysm follows paroxysm until the animal dies exhausted. In the treatment, little can be done besides following out the general rules given on p. 427 and keeping the animal in a darkened and roomy box stall, and perfectly quiet.

Tartar Emetic.—Few remedies have been more recklessly administered in veterinary pharmacy than this one, and, doubtless, vastly more harm than good has come of it. It is actually poisonous. Two to four ounces will kill a horse, though cattle can sustain twice as much. The symptoms of poisoning are, vomiting, diarrhea, staggers, thirst,

salivation, faintness, cold skin, colic, convulsions, palsy and death. The stomach and bowels are inflamed, and the lungs congested. The treatment should commence with full doses of tannin, powdered oak bark, gallic acid, or strong tea, which are the antidotes. If vomiting and purging continue, these should be followed by draughts containing opium or laudanum.

CHAPTER III.

THE MORE IMPORTANT DRUGS AND MEDICINES USED FOR ANIMALS.

Alphabetical List of the Most Useful Drugs, with their Doses, Forms of Administration and Formulas.

Classified List of Drugs, according to their Action on the System, with Explanations.

Drugs are the physician's tools, and whoever would qualify himself for the physician's business must obtain a certain degree of familiarity with them. For the present purpose this will not demand much study. The actual number of drugs which are of real and approved value in the treatment of diseases of stock are but few. Many remedies used in man must be omitted, because they do not act similarly on the lower animals; many others must be passed by, as they are altogether too costly to administer in the large doses required in brutes.

We shall describe briefly what we consider the most desirable remedies; and to make their presentation as clear and as convenient as possible, we shall arrange them, first, in alphabetical order, for ready reference; secondly, classified in groups, according to their action on the system. The dose given will, when not otherwise stated, be that suitable for a horse; cattle require about half as much again; while sheep and pigs should have about one-third as much as a horse. A table of weights and measures has been given on page 57. As many common drugs are known under several names, all these have been inserted, with references to the proper one used by apothecaries.

ALPHABETICAL LIST OF THE MOST USEFUL DRUGS EMPLOYED IN VETERINARY MEDICINE, WITH DOSES, FORMS OF ADMINISTRATION, ETC.

(The numbers refer to the receipts which have been given on previous pages.)

Acetate of Ammonia Solution (*Spirits of Mindererus*).—Dose 2 to 4 ounces, in water. An excellent cooling and strengthening remedy in feverish and weak conditions. For fevers of almost any kind the following are useful :—

No. 477.	Solution of acetate of ammonia,	
	Epsom salts, of each,	2 oz.
	Chlorate of potash,	1 oz.
	Water,	1 qt.

Give at a draught.

No. 478.	Solution of acetate of ammonia,	
	Chlorate of potash,	
	Tincture of gentian, of each,	1 oz.
	Water.	1 pint.

For an anti-febrile mixture, in influenza and other low forms of fever in horses and cattle.

Nos. 135, 163, 365.

Acetate of Lead (*Sugar of lead*).—See Lead, acetate of.

Acetate of Zinc—see Zinc.

Acetic Acid—see Vinegar.

Aconite, Tincture of root of.—Dose 10 to 20 drops; for sheep and pigs, 5 to 10 drops. An active poison in large doses. In moderate ones, an excellent sedative in the early stages of all acute inflammations and fevers, such as pleurisy, inflammation of the lungs, etc. When hard-worked horses are brought in with "chill and sore throat," two doses of aconite and a mustard plaster to the throat will generally check the disease promptly. In sharp attacks of colic, and in rheumatic fever, if combined with a brisk purgative (No. 94), it will often cure promptly. The same prescription is often of great service in beginning lockjaw. Applied as a lotion, it relieves painful swellings, itching, and hastens the cure of grease, mange, and other skin eruptions. A very good lotion for such skin diseases is—

No. 476.	Tincture of arnica,	
	" aconite, each,	1 oz.
	Water,	1 qt.

The tincture may be used hypodermically, often with great advantage, the dose being about one-third of that given by the mouth.

Nos. 29, 94, 128, 156.

Alcohol.—This, either pure, or as whisky, brandy, gin, etc., is extensively used against colic, poisoning by tobacco, exhaustion from disease and over exertion, great weakness, etc. In colds and sore throats of hard-worked horses, with fever and weakness, half a tumbler of whisky every few hours will often restore them. Cows with puerperal fever, with weak heart and cold surface, are often benefited by a tumbler of whisky every two or three hours. Alcohol is much valued externally as a lotion to bruises, cuts and sores. Whisky beaten up with white of eggs is popular as a preventive of chafing in parts exposed to rubbing, as under the saddle, etc.

Aloes.—Dose 5 to 6 drachms: cattle double as much. Hogs can bear but 20 or 30 grains. One of the most popular medicines for stock. In constipation and colic it is best given in solution, as a drench. Small doses are useful in indigestion and diarrhœa. In inflammation of all kinds, whether from wounds or diseases, a dose of aloes generally proves sedative and soothing. For dropsy and watery swellings small and repeated doses are called for. It is a medicine more effective in horses than in cattle, etc. It should not be given when females are pregnant, nor when there are piles; and in colds, influenza and inflammations of the bowels, it must be employed with caution. Given as a ball, the following is a good receipt:—

No. 479.	Powdered aloes,	5 drachms.
	Powdered ginger,	1 "
	Soft soap, as much as needed to make a ball.	

Aloin is now much used instead of aloes. The dose is a quarter as much. Nos. 20, 90, 98, 99, 100, 142, 153.

Alum.—Dose 2 to 4 drachms. Astringent and sedative. Used in diarrhœa (*scouring*), dysentery. For irritable sore throat it is used with an atomizer or a syringe. Externally, in solution, 5 grains to the ounce, it is a healing application in inflammation of the eye and in the sores of foot and mouth disease. In powder, it is effective for stopping the oozing of blood; mixed with equal parts of fine, dry clay, it is excellent, applied to harness galls and other surface wounds; and in strong solution removes the pain of burns and scalds. Nos. 85, 225, 266, 303.

Ammonia, Acetate of—see Acetate of Ammonia Solution.

Ammonia, Carbonate of (*Hartshorn salt, Smelling salts*).—Dose 2 to 4 drachms. A strong stimulant. The dose may be given dissolved in a half tumbler of whisky, or made into a ball with linseed meal and water. Valuable in influenza, erysipelas, and other weakening diseases. Nos. 75, 333, 374.

Ammonia, Muriate of (*Sal ammoniac*).—Dose 3 to 6 drachms, given like the carbonate. Its effects are similar, but not so powerful. Externally, it is a favorite application for hot swellings, bruises and strains. A good cooling mixture for this purpose is—

No. 480.	Sal ammoniac.		
	Nitre,	of each,	4 oz.
	Water,		8 oz.

Wet rags with it and keep applied to the part.

Nos. 22, 247.

Ammonia, Spirits of (*Liquid ammonia, Spirits of hartshorn*).—Principally used externally. It gives immediate relief to bites, and stings of gnats, mosquitoes, flies, wasps, etc. For snake bites it should be promptly rubbed into the bite. It is used in very many liniments. A good one is—

No. 481.	Spirits of ammonia,		
	Oil of turpentine,		
	Water,	of each,	1 oz.
	Linseed oil,		4 oz.

A useful stimulant draught for horses and cattle is—

No. 482.	Spirits of ammonia,		
	Sweet spirits of nitre,		
	Tincture of gentian,	of each,	½ oz.
	Ale or beer,		1 quart.

To be given for great exhaustion or weakness.

Nos. 103, 198.

Antimony (*Tartar emetic, Tartarized antimony*).—Dose 1 to 4 drachms; pigs, grains 4 to 10. This was at one time very extensively prescribed in inflammatory diseases of horses and cattle, but the best English authorities say it is entirely useless in them. In pigs it is a useful emetic, and still has credit when given in small doses (four grains), several times repeated, for keeping down inflammation. Tartar emetic ointment is a strong caustic, but should not be used externally, as it blemishes. Nos. 83, 149.

Antimony, Black or Sulphurated.—Used as an alterative. Of uncertain action, and doubtful value. No. 372.

Arnica.—Used externally as a healing remedy in strains, bruises, wounds, broken knees and sore shoulders. Useful combinations are—

No. 483.	Tincture of arnica,	1 drachm.
	Sulphate of zinc,	2 "
	Water,	10 oz.

No. 484.	Tincture of arnica,	1 drachm.
	Sugar of lead,	1 drachm.
	Water,	10 oz.

Arnica is somewhat irritant, and should be applied cautiously when the skin is broken. Internally it is valuable in chills and shivering. Nos. 159, 250, 348.

Arsenic.—Dose 5 to 10 grains; sheep, 1 to 2 grains. *Fowler's solution* is a popular form for administering it. This solution contains four grains of arsenic to the ounce. Very serviceable in chronic rheumatism and skin diseases. Externally it enters into many dipping mixtures for destroying lice and other vermin on sheep. Nos. 77, 79, 179, 182, 186, 461. See page 419.

Assafetida.—Dose, horses, 3 drachms; cattle, 2 ounces; sheep, 1 drachm. Occasionally given to horses and cattle, for colic and chronic coughs. Nos. 104, 105, 153, 154, 324, 403.

Belladonna.—Dose of the dried powdered leaves, 2 ounces; of the extract, 1 to 2 drachms. In influenza, sore throat, severe colds, inflammation of lungs, and the like, this is a valuable remedy. For sore throat, with noisy breathing and spasmodic cough in horses, no other medicine gives such immediate relief. Excessive sweating, from weakness, is promptly checked by a full dose. Externally it relieves irritable and painful wounds, the raw surface following frost-bite, cracks from mud fever, etc. Inflammation of almost any part of the eye is relieved by belladonna. Its active principle is *atropia*. This can be very neatly administered with the hypodermic syringe; ten drops, of a solution of five grains of atropia to the ounce of water, is the proper strength for a horse, repeated as necessary. Nos. 77, 139, 157, 165, 264, 268, 273, 274.

Bleaching Powder—see Lime chloride.

Blistering Ointment—see Cantharides.

Blue Stone, Blue Vitriol—see Copper sulphate.

Bole Armenian.—A kind of clay, used formerly as a coloring ingredient; of no medicinal value.

Borax (*Biborate of Sodium*).—Used externally as a wash to sores and ulcers, especially in calves and lambs. The powder may be sprinkled on the part. It is a feeble irritant. No. 85.

Bromide of Potassium—see Potassium.

Calomel—see Mercurials.

Camphor.—Dose, horses, 1 to 2 drachms; cattle, 2 to 4 drachms; sheep and pigs, ½ drachm. As a sedative, it is given in chronic cough, colic, diarrhea and influenza. Externally, spirits of camphor are very popular, as an application to sprains, bruises and wounds, and enter into many liniments. Nos. 77, 78, 164, 169.

Cantharides (*Spanish Flies, Blistering Flies*).—Their use should be external, chiefly. *Blisters* are useful in the later stages of inflammation, and in local watery swellings and effusions. After an attack of pleurisy, a blister will hasten the disappearance of water from the chest. For checking inflammation of the jugular vein, in a horse, nothing is so prompt as a long, narrow blister along the tense, corded, swollen vessel of the neck. Slow abscesses are brought to a head by a blister. For healing obstinate, unhealthy, old ulcers, nothing so often succeeds as to apply a large blister, covering both the ulcer and an inch or so of the flesh around it. *Ointments* of cantharides are much employed by veterinarians for blistering purposes.

In applying any blistering preparation, the hair should first be shaved off. The animal should be prevented from rubbing and breaking the blister when it rises. On the second day after it has been applied, the part should be well bathed with warm water, and dressed with washed lard, oil, or unsalted butter. *Liniments* of cantharides are used to stimulate a part, short of blistering it. An average strength is—

No. 485.	Powdered cantharides,	1 oz.
	Linseed oil,	10 oz.

To be rubbed in.

Nos. 13, 16, 17, 18, 19, 32, 33, 167, 234, 235, 237.

Capsicum (*Red pepper, Cayenne pepper*)—see Pepper.

Carraway Seed.—Dose ½ oz. Used as a stomachic, with other medicines.

Carbolic Acid.—Dose 10 to 40 drops; sheep and pigs, 5 to 10 drops. One of the most valuable veterinary medicines. In strangles, putrid sore throat, low fevers and farcy, given in full doses, often repeated, it greatly lessens the severity of the disease. In indigestion, dyspepsia and flatulence, it nearly always succeeds. Wounds should be freely washed with a one per cent. solution. Overreaches, quittors and troublesome ulcers, should be covered with oakum, which should be kept wet with the solution. For stings, bites, skin diseases and parasites, it has numerous applications. As an antiseptic and disin-

fectant, and hence a preventive of disease, it should be in every barn and stable. Nos. 151, 220, 241, 279, 288, 307, 318.

Castor Oil.—Dose 1 pint; sheep and pigs, 3 to 4 oz., or 6 or 8 beans. A mild purgative; efficient, though slow, in its effects. For young animals, about the best purge. When given to adult horses or cattle, it is best to combine with it half a pound of Epsom salts. Nos. 110, 130, 330, 376, 404.

Catechu.—Dose ½ oz. A useful vegetable astringent in diarrhea, flux, etc. Nos. 121, 131, 370, 387.

Chalk—see Lime carbonate.

Charcoal.—Dose 1 oz. Used for indigestion and dyspepsia, with fetid feces. It can readily be given in gruel. Externally, it may be dredged or sprinkled on foul sores.

Chloral Hydrate.—Dose 1 to 2 ounces; sheep and pigs, 1 to 3 drachms. One of the best agents to quiet irritability and produce sleep. Used in colic, asthma, brain disease, convulsions of all kinds, etc. A solution of a drachm to the ounce is one of the best applications in obstinate ulcers, old galls, wounds, etc. Can readily be injected subcutaneously. Nos. 96, 126, 243, 377.

Chloride of Lime—see Lime.

Chlorate of Potash—see Potash.

Chloride of Sodium (*Common Salt, Dairy Salt*)—see Sodium Chloride.

Chloroform.—Dose 1 to 2 drachms. As an anodyne in colic, asthma and troublesome cough. Principally used as an anæsthetic. For this purpose 2 or 3 ounces are generally sufficient for horses and cattle, 1 to 2 ounces for sheep and pigs. A sponge saturated with this amount may be placed in a nose-bag and fastened to the head, or held to the nostrils. The animal should be well secured, as the earlier effect of chloroform is to produce a state of excitement. Air must be allowed to enter freely with the chloroform, as its pure vapor is poisonous. A safer though slower anæsthetic is the mixture No. 12.

For internal use a mixture called *chloric ether* is very popular in England. It is—

No. 486.	Chloroform,	1 part.
	Pure alcohol,	19 parts.

Dose, horses, 1 ounce; cattle, 2 ounces; sheep and pigs, ½ ounce. Mr. Dun says such a dose, with half a teaspoonful or a teaspoonful of laudanum, diluted with water, is one of the most effectual anti-spasmodics and nerve soothers he has ever used. Nos. 92, 139, 364.

Cinchona (*Peruvian Bark, Quinine*).—As a tonic and for use in fevers, no medicine equals the active principles of Peruvian bark. Unfortunately, quinine is too dear for veterinary practice. Cheaper and very efficient preparations are cinchonia and cinchonidia; or the powdered bark itself may be used. Dose of quinine, horses and cattle, 20 to 40 grains; pigs and sheep, 10 grains of powdered bark; half an ounce to horses. They are used in exhaustion and debility, in scrofula, rheumatism, diabetes, sheep's rot, influenza, etc. Nos. 88, 146, 178, 194, 203, 335.

Cod-liver Oil.—Dose 4 to 8 oz. An excellent tonic; valuable in exhausting diseases, especially in young animals. Nos. 132, 292.

Copaiva.—Dose, as diuretic, ½ oz. to 1 oz.; as an expectorant in coughs, 1 or 2 oz. No. 209.

Copper Sulphate (*Blue Vitriol, Blue Stone, Vitriol of Copper*).—Dose, horses and cattle, 1 to 2 drachms; sheep and pigs, 10 to 20 grains. A tonic and astringent; used solid as a mild caustic; in large doses poisonous. Copper sulphate is much used in excessive watery or bloody discharges from the bowels. In glanders and exhausting diarrheas, it is one of the best remedies. As a stimulant and caustic, it is used on inflamed eyelids, fistulous and slow healing wounds, foot rot in sheep, and the like. *Copper subacetate, or verdigris*, is sometimes used like the sulphate, but is a more irritant poison, and might as well be dropped. Nos. 118, 134, 178, 180, 213, 215, 310.

Copperas—see Iron Sulphate.

Corrosive Sublimate (*Corrosive chloride of mercury*)—see Mercurials.

Cream of Tartar—see Potash bitartrate.

Creasote.—Dose 20 to 40 drops. This is made from wood tar, and is a useful preparation. It is used to check unhealthy discharges, and as an antiseptic. In farcy, nasal gleet, scouring, etc., it is given internally. Externally, it is an excellent remedy to relieve itching, destroy vermin, to dress foul wounds, and recent burns. For these purposes it may be used as an ointment, 1 dr. to lard 1 oz., or 1 dr. to water ½ pint. Nos. 120, 174, 200, 326, 398.

Croton Oil.—Dose, for a horse, 20 drops; for cattle, 50 drops; for sheep and swine, 5 to 10 drops. The oil is made from the seeds of the plant. Ten or twelve seeds is a dose for a horse. A powerful and prompt purgative, and externally a sharp irritant, producing numerous little pustules. Valuable in fardel bound, and other forms of obstinate constipation. Externally, it is used for pleurisy, pneumonia, chronic rheumatism, obstinate swellings and the like. It should not be applied to horses, as it blemishes. Nos. 89, 91, 323, 388, 375.

Digitalis.—Dose of the powdered leaves, horses, 30 grains; sheep and pigs, 10 grains. Very useful to reduce temperature at the outset of fevers, etc., to strengthen the heart when diseased, for broken wind, and to reduce dropsy. It acts on the kidneys promptly. It may also be given in an infusion from the leaves (1 drachm of the leaves to a pint of cold water), and the active principle of the plant, *digitalin*, is very convenient for hypodermic use, about one-twentieth of a grain, repeated as needed. The effects of digitalis are rather slow, not being visible sometimes for 10 or 12 hours. Nos. 76, 82, 155, 167,320, 434.

Epsom Salts (*Sulphate of magnesia*)—see Magnesium sulphate.

Ergot.—The spur of diseased rye. Used both to hasten and facilitate the birth of animals, and to prevent abortion in dropping. Dose, for a mare or cow, 1 oz.; for sheep and swine, 1 drachm. A simple decoction, swallowed, dregs and all, is the best form for veterinary practice. Ergot is also useful in bleeding from the lungs, nose, stomach or bowels. For this purpose it is best given by hypodermic injection of its active principle, *ergotin*, in five-grain doses, in solution, repeated as often as necessary. Nos. 24, 405. Page 325.

Ether (*Sulphuric ether*).—Used as an anæsthetic and stimulant. As an anæsthetic, the mixture recommended under *chloroform* is better than ether alone. As a prompt and diffusible stimulant, the dose is, for horses and cattle, 2 ozs.; for sheep and pigs, ½ oz. It is called for in the chills and shiverings which often usher in diseases, and is especially called for in hard-worked horses in town, when struck down by influenza, etc. It relieves cramps, colic, stomach staggers and fainting fits. Nos. 12, 28, 95, 98, 102, 319.

Fennel Seed.—Dose 1 to 2 oz. Used as a stomachic, with other medicines.

Gallic Acid.—Dose ½ oz. A popular vegetable astringent, in diarrhea, etc. Nos. 122, 302.

Cinger.—Dose ½ to 1 oz. of the powder, 1 drachm of the essence. A useful stimulant and stomachic, in colic, diarrhea and exhaustion. Much employed in combination with other medicines, to prevent griping and render them more acceptable to the stomach. Nos. 121, 335.

Centian.—One of the most esteemed vegetable tonics. Dose of the powder ½ oz. to 1 oz. Nos. 86, 123, 189, 196, 337.

Clauber Salts—see Soda, sulphate of.

Clycerine is a cleanly and useful application for sores and galls. In cracked heels, sore mouths, harness galls and the like, it should be diluted and mixed with tannin, as follows:—

No. 487.	Glycerine,		8 oz.
	Starch,		1 oz.
	Tannic acid,		½ oz.

The following is an excellent application to sores, old galls, burns or foul wounds:—

No. 488.	Glycerine,		
	Water,	of each,	4 oz.
	Carbolic acid,		½ oz.

To be painted on with a brush.

Cuaiacum.—Used as an expectorant: one of the best, in the lower animals. Nos. 66, 321.

Hartshorn—see Ammonia.

Hellebore, White.—Used as an irritant. No. 14.

Iodide of Potassium—see Potassium, iodide of.

Iodine.—Usually employed as the tincture. Dose 30 to 60 drops, on an empty stomach. Generally used externally, painted on the skin, to reduce swellings of the joints, strains, hardenings of the udder, cold abscesses, scrofulous glands, skin diseases, and for indolent ulcers and unhealthy wounds. Nos. 81, 170, 172, 183, 202, 238, 253, 255, 315, 426.

Iron, Chloride of.—The tincture of the chloride of iron is an efficient tonic, astringent and alterative. The dose is ½ oz., well diluted. Nos. 74, 117, 188, 203.

Iron Sulphate (*Green vitriol, copperas*).—Horses, 2 to 3 drs. Sheep, 20 grs. Astringent and tonic. Can be mixed with soft food and given several times daily, where there is want of tone of the system and torpidity of the bowels. It is a cheap and efficient tonic, but turns the feces of a black color, and gives them a disagreeable odor. After it has been

given five or six days, it should be suspended for a few days, so as to avoid irritating the stomach. Nos. 2, 152, 161, 176, 205, 322, 423, 428.

Ipecacuanha.—Dose ½ oz. A diaphoretic and expectorant. Useful in dysentery. Not very efficacious in the herbivora. Nos. 67, 137.

Laudanum—see Opium.

Lead Acetate (*Sugar of lead*).—Dose 1 drachm; calves, sheep, pigs, 10 to 15 grs. Used to check bleeding from the lungs and bowels, profuse scouring, red water, etc., especially when combined with opium. Externally, 5 or 10 grains dissolved in an ounce of water, it is excellent to soothe and heal burns, bruises, irritable and moist ulcers; to cool and relieve inflamed tendons, moist skin diseases, and cracked and itching skin diseases. It has been often used as an eye wash, but for this it is not suitable, as the lead is apt to leave a permanent stain or film on the eye, over the cornea. Nos. 119, 226, 227, 228, 248.

Lime, Lime Water (*Calcium oxide, quicklime, aqua calcis*).—Lime is irritant, corrosive and antacid. Lime water is made by briskly stirring four ounces of freshly burned lime in a gallon of water, letting it settle, and pouring off the clear solution. It is an excellent antacid in indigestion, hoven, and diarrhea in cattle and calves. Dose 2 to 6 ozs. Mixed with linseed oil, in equal parts, it is one of the best applications in burns and scalds, and in watery and itching skin diseases. Powdered slaked lime is used as an antacid. Dose 1 dr., mixed with moist food. Nos. 265, 385.

Lime Carbonate (*Calcium carbonate. Chalk*).—Dose, horses, 1 to 2 ozs.; sheep, pigs, 2 to 4 drs. One of the cheapest and most convenient antacids, much used in indigestion, chronic diarrhea, and dysentery. May be given in milk or moist feed. Nos. 113, 116, 120, 121, 133, 385.

Lime Chloride (*Chlorinated lime, bleaching powder*).—Principally used as a disinfectant. Scattered about the stable, it keeps away flies, rats and mice. Used externally for unhealthy wounds, mange and grease. Of little or no value internally. It may be advantageously mixed with equal parts of powdered sulphur. Nos. 3, 231, 312.

Lunar Caustic—see Silver nitrate.

Lobelia Inflata (*Indian tobacco*).—Used as a nauseant and de-

pressant in nervous excitement, lockjaw, mad staggers, etc. Dose of the tincture, 1 ounce.

Linseed.—Valuable as a diet. Nos. 5, 6.

Linseed Oil.—Dose, as a cathartic, 1 to 2 pints. A bland and unirritating purge, useful in young and weakly animals. Often valuable in choking in cattle. Externally it is a soothing dressing. Nos. 89, 91.

Magnesia, Sulphate of (*Epsom salts, Sulphate of magnesia*).—Dose, as a purgative in cattle, 1 to 2 pounds; calves, sheep and pigs, 3 to 6 ounces. A popular febrifuge, purgative and alterative, but not desirable as a purge for horses, as it sometimes acts very violently on them. It is, however, valuable to them in small doses, repeated, say 1 to 2 ounces, several times a day, to "cool the blood," in influenza, pneumonia, and, indeed, most febrile inflammatory disorders. It should be given in ten or fifteen times the quantity of water, and mixing it with molasses and ginger will nearly conceal the taste, and allow of giving it in soft food. Nos. 144, 145, 331, 332.

Mercurials.—Mercury or quicksilver is used as *Mercurial ointment, Mercurial liniment, Mercury with chalk* (*Gray Powder*), *Red Precipitate* (*Red Oxide of Mercury*), *Calomel* (*Mild Chloride of mercury*), *Corrosive sublimate* (*Corrosive Chloride of mercury*) and *Citrine ointment* (*ointment of Nitrate of Mercury*).—Of these we may use internally, mercury with chalk, dose 15 to 20 grains, in indigestion and diarrhea in young calves; but calomel, dose 30 to 60 grains, is generally preferred, combined with chalk, magnesia or opium. Calomel is much less used now than formerly, and is mostly confined to some diseases of the stomach and bowels. Corrosive sublimate is a very valuable internal remedy in arresting the slimy, bloody discharges of chronic dysentery in cattle. Dose, horses and cattle, 5 to 8 grains; sheep and pigs, 1 grain. Externally mercurial ointment is used as a stimulant for old sores, ulcers and swellings, and for destroying lice and vermin. But for the latter purpose other agents are better, as the mercury is apt to be absorbed, and to poison the animal. A weak solution of corrosive sublimate, 20 grains to the pint of water, is used for the same purpose. Citrine ointment is used in chronic skin diseases, ringworm, etc., but is easily absorbed, and must be cautiously used. Nos. 76, 90, 147, 162, 186, 194, 234, 236, 239, 350, 383.

Muriatic Acid (*Hydrochloric acid, Spirit of salt*).—Dose of the diluted medicinal acid 1 to 2 drachms, in a quart of water. An excellent remedy, given with the food, in indigestion in lambs and calves,

and in weak animals without appetite, and which do not thrive; also in febrile and exhausting diseases, and in hemorrhages. May be advantageously combined with iron, gentian, Peruvian bark or other bitters. Externally, the strong acid is a powerful caustic; diluted, it may be applied to ulcers with proud flesh; and as a cheap and penetrating disinfectant, it is suitable for pouring on carcases of diseased animals which have died of contagious diseases. No. 141.

Mustard (*Sinapis*).—Dose ½ oz. Best given as a pill or ball. A stomachic and mild stimulant, in colic, cramps, dyspepsia, etc. Principally used externally, as the popular "mustard plaster." For ordinary purposes, it may be mixed with tepid water; mixed with whisky or vinegar, the action is slower; with turpentine or spirits of ammonia, the action is much more prompt and severe. The oil of mustard rubbed in is a strong blistering fluid. For all domestic animals, mustard plasters are admirable means of reducing inflammations, relieving pain, lessening swellings and stimulating parts. Nos. 190, 395.

Nitre (*Nitrate of Potash*)—see Potash nitrate.

Nitrate of Silver (*Lunar caustic*)—see Silver Nitrate.

Nitric Acid (*Aqua fortis*).—Dose of the dilute medicinal acid 1 to 2 drs., well diluted. Internally a stimulant and antiseptic, useful in dyspepsia, low fever, and diarrhea. The strong acid is used as a caustic for removing warts, proud flesh, etc. It is generally applied on a splinter of soft wood. A drachm of the strong acid to a pint of water is a valuable wash for foul sores, old ulcers, foot rot, and sloughing wounds. It is also serviceable in abating itching, nettle rash and mange. No. 229.

Nux Vomica and Strychnine (*Strychnia*).—Strychnine is the active principle of the plant nux vomica. The dose of the powdered nux is, for horses, 1 dr., cattle, 2 drs., sheep and pigs, 20 grs., given in a ball. Far more convenient is strychnine used with the hypodermic syringe, as—

No. 489.	Strychnine,	5 grains.
	Water,	6 drachms.
	Alcohol,	2 drachms.

Of this ten drops contain one-tenth of a grain of strychnine, and 20 or 30 drops may be thrown at one time under the skin of the horse.

Internally, a horse may take 2 grains of strychnine. Both nux and strychnia are of unequaled value in stiffened and partly paralyzed animals. To be used with advantage, they must be continued and the dose

increased, until the animal has twitchings of the muscles, usually first noticed at night. Nos. 31, 86, 146, 157.

Oil of Tar—see Tar.

Oil of Vitriol—see Sulphuric acid.

Olive Oil (*Sweet oil.*)—Laxative and demulcent. Dose 1 to 3 pints.

Opium is employed principally as *powdered opium*, *laudanum*, (*tincture of opium*), and *morphine*, which is one of its active principles. Horses and cattle can take 2 drachms of powdered opium, or 3 or 4 ozs. of laudanum, or 5 to 10 grains of morphia at a dose. An invaluable means of giving an opiate is to inject one or two grains of morphia under the skin. Calves, sheep and pigs about one-sixth of these doses. Hardly any drug has more uses than opium. It is a stimulant in exhaustion and weakness, it allays pain and restlessness, it checks excessive secretion and vomiting, it relieves the spasms of colic, dysentery, lockjaw and many convulsive diseases. It should not be given in active inflammation, when the skin is hot and dry, and the pulse strong, in inflammation of the brain, nor in obstinate constipation. Nor is it considered safe in diseases of the lungs, when the breathing is shallow and rapid. When an animal is suddenly taken with shivering and chills, a full dose of opium will often cut short the impending disease. At the very commencement of a cold, when the nostrils begin to run, a similar treatment will abort the attack. Nos. 73, 76, 78, 118, 119, 120, 124, 169, etc.

Morphia—see Opium.

Pepper, Black and Red (*Capsicum, Cayenne pepper*).—Dose 2 to 3 drachms. Used in indigestion and colic, and sometimes as a plaster or liniment on the skin. Less esteemed now than formerly.

Petroleum (*Rock oil, Seneca oil, etc*).—The crude oil should be used only as an external application to galls, cuts, bruises, scratches, etc. Internally, *kerosene* and *benzine* are valuable in coughs, colds, croups, colics and intestinal obstruction. Dose 1 to 4 ounces. Benzine is said to prevent trichinæ in hogs. Kerosene destroys lice.

Peruvian Bark—see Cinchona.

Podophyllin (*The active principle of the May apple or Hog apple*).—Dose, 1 to 3 drachms. This is an active purgative in man, but has little effect on the lower animals. It is said to be a sedative to the heart. No. 337.

Potash, Bitartrate of (*Cream of tartar*).—Cooling, laxative and diuretic. Dose 2 or 3 ounces, well diluted in water. Nos. 108, 161.

Potash, Bromide of.—Dose ½ ounce to 1 ounce. A seda tive, to allay nervous excitement. Nos. 25, 187.

Potash, Bicarbonate and Carbonate.—Dose ½ ounce to 1 ounce. An alkali, sometimes used in indigestion.

Potash, Iodide of.—Dose ½ ounce to 1 ounce. Prescribed in chronic rheumatism, scrofulous enlargements, chronic coughs, and to cause absorption in pleurisy and inflammation of the lungs. Nos. 75, 81, 140, 170, 173.

Potash, Nitrate of (*Nitre, Saltpetre*).—Dose ½ ounce to 1 ounce. An alterative, febrifuge and diuretic. Much used in condition powders, febrile complaints, dropsy and inflammations. Externally, it is added to cooling lotions. Nos. 78, 79, 160.

Potash, Chlorate of.—Dose 2 to 4 drachms. Useful in fevers, inflammation and sore throats. Externally as a wash to foul ulcers, etc. Nos. 66, 84, 106, 311.

Quinine—see Cinchona.

Salicylic Acid.—Dose, 1 to 2 drachms. A valuable antiseptic and febrifuge. In all descriptions of wounds it arrests putrefaction, lessens pain and hastens healing. A convenient solution for external use is—

No. 490.	Salicylic acid,		
	Borax,	each,	10 grains.
	Water,		1 oz.

Apply on rags, tow or oakum.

In acute rheumatic fever the dose above given, repeated three or four times a day, will generally greatly hasten the cure. No. 192.

Saltpetre—see Potash nitrate.

Silver, Nitrate of (*Lunar caustic*).—Dose, internally, 5 to 6 grains, made into a ball. For external purposes small sticks of the fused nitrate are sold; or an ointment may be made, 5 to 10 grains to the ounce of water; or a solution, of any desired strength. The antidote is common salt, which should be at hand to check the over-action of the caustic. Internally, it is a tonic, stimulant and astringent, useful in diarrhea, dysentery, cholera and wasting fevers. It is generally used externally.

As a caustic it removes proud flesh, warts and angleberries, and freshens the surface of obstinate sores. For sore teats, foot rot and the like, it is an excellent application. Nos. 27, 129, 224.

Soap.—Common soft soap, well rubbed in several times, is often a cure of skin disease. It is also popular in clysters and liniments. Hard soap is much employed in making liniments, ointments, balls, etc. Nos. 207, 209.

Soda, Bicarbonate of (*Baking soda*).—Dose ½ to 1 oz. An excellent alkali. Nos. 86, 123, 192.

Soda Bisulphite of.—Dose ½ to 1 oz., as a disinfectant internally. Nos. 113, 281, 313.

Soda, Chloride of (*Common salt*).—Dose, as a purgative to the ox, 1 lb.; sheep, 1 to 3 ozs. In large doses salt is an efficient purgative for these animals, but should not be given for this purpose to the horse, as its action is uncertain and violent. In small doses it is a digestive stimulant and stomachic. Nos. 87, 151.

Spanish Flies—see Cantharides.

Strychnine.—Dose 3 to 4 grains to a horse. A powerful tonic and nervous stimulant. Nos. 30, 80.

Sugar of Lead—see Lead acetate.

Sulphate of Magnesia—see Magnesium sulphate.

Sulphate of Strychnia.

Sulphur (*Brimstone*).—Dose, as a laxative, 4 to 6 ozs.; as an alterative, 1 to 2 ozs. Its value as such is not very great. Externally, sulphur ointments are very popular for vermin and parasitic skin diseases. Nos. 108, 161, 190, 283, 290, 291, 351.

Sulphuric Acid (*Oil of vitriol*).—Dose of the medicinal acid 1 to 2 drachms; as an external wash 20 drops of the strong acid to 1 oz. of water. Used in a similar manner to Nitric and Muriatic acids, which see. Nos. 4, 184, 191, 216, 363.

Sulphurous Acid.—Dose of the medicinal solution 1 to 2 ozs. One of the cheapest and best antiseptics. The acid is evolved in a gaseous state by burning sulphur. Flour of sulphur sprinkled on a shovelful of hot coals will evolve it rapidly, and a stable can thus be

thoroughly purified. The medicinal acid is an excellent soothing application to irritable wounds. It can be used with the atomizer. No. 1.

Sweet Oil—see Olive oil.

Sweet Spirits of Nitre.—Dose 1 to 2 ozs. A stimulant, diuretic and antiseptic. Valuable in indigestion, colic, low fever, inflammatory diseases and kidney disorders.

Tannic Acid.—Dose 10 to 20 grains. A powerful astringent in diarrhea and mucous discharges. Used as an injection for the whites, to relaxed membranes. Nos. 69, 115, 125.

Tar.—Largely used as an external dressing to wounds, chaps, galls, mallenders, grease, ringworm, foot rot, etc. Internally, it is a vermifuge, and benefits chronic cough. Dose ½ to 2 ozs. *Tar ointment* is made by mixing equal parts of tar and lard at a gentle heat; *tar water*, by pouring a gallon of boiling water on a pint of tar, stirring and letting it settle. *Oil of tar* is an impure turpentine, obtained from distilling tar; it is used for sheep dips, etc. It is an excellent antiseptic. Nos. 212, 216, 246, 293, 285.

Tartar Emetic—see Antimony.

Tobacco.—Dose 1 to 2 drachms, dissolved in hot water. As a relaxer of the muscles, tobacco is used in colic and obstinate constipation, tetanus, and convulsions. Externally, it is popular as a destroyer of fleas, ticks and lice. Nos. 294, 297.

Turpentine (*Oil of turpentine, Spirit of turpentine*).—Dose ½ to 2 ozs. A valuable stimulant, antispasmodic, diuretic and vermifuge. But administered mixed with olive or linseed oil, or shaken up with milk, gruel, or white of eggs and water. Largely used in indigestion, colic, worms, coughs, rheumatism, low fever, etc. Externally, as a liniment in rheumatic swellings, sprains, bruises, frost bite, vermin, etc. It should not be used where there is high fever, or irritation of the bowels or urinary organs. Nos. 70, 90, 91, 94, 148, 150, 207, 208, 388.

Veratrum Viride (*the Water hemlock*) is highly esteemed by some to reduce the pulse and fever in acute inflammations. Dose ½ oz. of the saturated tincture.

Verdigris—see Copper subacetate.

Vinegar.—Principally used externally as a convenient stimulant in strains, bruises and superficial inflammations. As *acetic acid* a dis-

tilled and concentrated vinegar is sold by druggists; dose 1 to 2 drachms, well diluted. It is used as a cooling addition to drinks, and as an antidote to alkalies. Nos. 174, 218.

Vitriol, Blue—see Copper sulphate.

Vitriol, Green—see Iron sulphate.

Vitriol, White—see Zinc sulphate.

Zinc Chloride (*Butter of zinc*).—A powerful caustic, used externally in foot rot, malignant growths, and the like. Dissolved, 5 grains to the ounce of water, it is a capital wash to destroy vermin and disinfect foul wounds. Nos. 177, 217.

Zinc Oxide.—(*Flowers of zinc.*) An excellent drying powder for weeping surfaces, moist skin diseases and chafes. An ointment of 1 drachm to lard 1 ounce is one of the most soothing to irritated surfaces. Nos. 227, 267.

Zinc Sulphate—(*White vitriol*). Principally used externally as a stimulant and astringent in weak wounds, foul ulcers, ophthalmia, chronic skin diseases, etc. The solution is usually made of 5 or 10 grains to the ounce of water. Also as a disinfectant. Nos. 2, 26, 185, 218 270.

CLASSIFIED LIST OF DRUGS,

ACCORDING TO THEIR ACTION ON THE SYSTEM, WITH EXPLANATIONS AND FORMULAS.

When we wish to bring about a particular effect on the system we select as medicines those agents which experience has shown to produce the desired action; and with this end in view, drugs have been arranged in classes, with reference to their specific or peculiar action. The practical utility of such an arrangement will be obvious; and for that reason we give below a scheme of the kind, omitting various minor divisions of no great importance.

ALTERATIVES.

These are medicines which *alter* or correct some faulty condition of the blood or secretions. They are used when animals are "out of condition," and in scrofula, rheumatism, distemper, anæmia, and chronic diseases generally. The principal alteratives are:—

Mercury and its preparations.
Iodine and its preparations.
Arsenic.
Sulphur.
The Salines (Nitre, Epsom, Glauber and Common Salt).
Alkalies (Potash, Soda, Lime).
Vegetable alteratives (Podophyllin, Poke).

Mercury, in the form of calomel, was formerly much more largely employed than it is now. Nevertheless, in the commencement of some acute diseases, and also where an active fillip to the liver is required, it is a valuable remedy.

Iodine is used principally in the form of the iodide of potash.

Arsenic is very highly esteemed. Its most convenient form is Fowler's solution of arsenic, one ounce of which is the average dose for a horse.

The *Salines* and *Alkalies* increase the discharge from the kidneys, bowels and skin. They may often be advantageously combined with sulphur, as—

No. 491.	Nitre,		
	Sal ammoniac,	of each	1 drachm.
	Sulphur, flowers of		1 oz.

Mix with gruel, oil, milk, or molasses and water, for a draught.

Other alterative receipts are Nos. 181, 182, 183, 461, 462.

ANÆSTHETICS.

These are given for the purpose of benumbing the senses and preventing pain. The two most important ones are—

Chloroform, and
Ether.

The method of administering them will be found on page 61.

ASTRINGENTS.

This class of medicines are used to check excessive discharges, especially from the bowels, and also to stay bleeding. The principal astringents are—

Alum,
Acetate of lead,
Tannic and gallic acids and vegetables containing them,
The mineral acids,
Ergot.

They should not be used when there is extensive inflammation and high fever; nor is it well to give them at the outset of many complaints, as diarrhea, for instance, as the increased discharge is often an effort of nature to relieve the system of irritating substances. Formulas for astringents will be found on pages 138, 139, 144, 145, 337, 370.

CAUSTICS.

These are required to destroy "proud flesh;" to kill the virus in poisoned wounds: to stimulate old ulcers and destroy sloughs; to excite healthy action in fistulas; to remove warts and tumors: and the like. The most important are—

Nitrate of silver (lunar caustic),
Nitrate of mercury,
Nitric acid,
Chloride of zinc,
Butter of antimony,
The hot iron.

The nitrate of silver and chloride of zinc can be bought in pencils, which can be placed in holders and used very conveniently. The first mentioned is the most popular of all the caustics.

Nitric acid is very valuable for limited but powerful impression. It is readily applied by dipping the end of a match or a larger piece of wood in the fuming acid, and applying it to the part. The pain is intense, but of short duration.

Butter of antimony is rejected by some surgeons but is very highly esteemed by others (see page 359).

The *hot iron* is an efficient and powerful caustic, too little used nowadays owing to a weak sentimentality.

Caustic solutions and formulas are given, Nos. 215, 216, 217, 220, 221, etc.

COUNTER-IRRITANTS.

This class includes *rubefacients*, which redden the skin; *vesicants*, which raise blisters; and *suppurants*, which produce sores on the surface. The principal ones are—

Alcohol, Turpentine. Ammonia, Mustard,	Rubefacients.
Cantharides, Boiling water, Iron at 212°	Vesicants
Croton oil. Tartar emetic ointment,	Suppurants.

All these agents, by setting up an inflammation on the surface at no great distance from an internal one, withdraw from it some of the blood and serum which surrounds it, and thus diminish its intensity. They are of frequent service in almost all attacks of congestion and inflammation of the internal organs, of the bones, joints and deep tissues. Even in influenza, fevers, and other general disorders of a depressing character, an active rubefacient, such as a mustard paste, well rubbed into the legs

and washed off in five or ten minutes, is of much benefit in reducing the temperature and stimulating the powers.

Counter-irritants should not be placed too near the affected parts; nor should vesicants be used when inflammation is high. Suppurants are valuable for old chronic complaints.

For directions for blistering see page 68; and for various formulas for counter-irritants see under Cantharides, p. 440.

DEMULCENTS.

These are gummy, or glutinous solutions, intended to soothe and coat inflamed surfaces. They are of great value in inflammations of the membranes of the throat, stomach and bowels, in kidney diseases, and other irritable conditions. The principal demulcents are—

Linseed tea.
Slippery elm bark tea.
Gum arabic water.
Starch water.
Sweet oil.

All of these are serviceable, and the two first mentioned are particularly so, as they are both excellent and cheap. Examples of their use will be found in formulas, Nos. 5, 6, 169, etc.

DISINFECTANTS AND DEODORIZERS.

These have been fully considered on previous pages, 28, 29, 421.

DIURETICS AND DIAPHORETICS.

Diuretics increase the action of the kidneys, and consequently the amount of urine; *diaphoretics* act on the skin, and augment the amount of perspiration. They are allied in character and use, being employed to relieve the pressure on other organs of secretion, and diminish feverishness. Horses sweat more readily than cattle, and are more easily acted upon by sweating medicines. The principal drugs of this class are—

Nitrate of potash (nitre),
Bitartrate of potash (cream of tartar),
Turpentine,
Sweet spirits of nitre,
Digitalis,
Cantharides,
} Diuretics.

Solution of acetate of ammonia Ipecacuanha (small doses), Dover's powder, Tartar emetic,	Diaphoretics.

Warm water is an efficient agent for both purposes.

When any of the above are given, and the animal covered with cloths and kept in a temperature of 70°, the action will be mainly on the skin; but when uncovered and exposed to a lower temperature, the action will be on the kidneys. A cheap and effectual diuretic ball for a horse is—

No. 489. Nitre,
Resin,
Soft soap, of each ½ oz.

Three-fourths of an ounce of each of these, dissolved in a quart of water, is a diuretic drench for a cow.

For other examples of medicines of this class, see Nos. 163 164, 166.

EMETICS AND EXPECTORANTS.

Emetics are given to produce vomiting; *expectorants* to loosen mucus in the breathing tubes, and facilitate its expulsion. The horse, cattle and sheep cannot vomit, therefore emetics have no place in their treatment; and expectorants have very little effect on them. The best formulas will be found in Nos. 50, 51, 57, 58, 321.

NARCOTICS, ANODYNES AND SEDATIVES.

These are employed to allay pain, soothe irritability, and quiet excessive nervous action. The most valuable narcotics in veterinary pharmacy are—

Opium (including laudanum and morphia).
Belladonna.

Each of these has innumerable applications, and they must be regarded as about the most valuable drugs to the veterinarians. Their many uses will be seen by consulting the formulas referred to in the premium list.

In the class of sedatives whose action is to lower nervous force, the principal are—

Aconite,
Veratrum viride.

These are very largely used by many practitioners to reduce the pulse and abate the febrile symptoms, at the outset of acute inflammations. They have been referred to in formulas given in the foregoing list.

PURGATIVES OR CATHARTICS.

These are designed to bring about evacuation of the bowels. They are an exceedingly valuable class of remedies. The principal ones are—

Aloes,
Salts (Epsom, Glauber and common salt),
Oils (linseed, castor, Croton).

Aloes are especially useful in horses; the salts and the oils, in cattle and sheep. The rules for their administration and formulas for their proper combination will be found in the alphabetical list.

STIMULANTS.

These are intended to give prompt assistance in an exhausted condition. The strength they confer is not lasting, therefore too much reliance should not be placed upon them. But in many emergencies they are invaluable, and save life when nothing else will. The main ones are—

Alcohol. (Whisky, brandy, gin, wine, ale, etc.)
Ether.
Carbonate of ammonia.
Turpentine.
Ginger.

Where there is active inflammation or high fever, stimulants should be withheld; but in wearing chronic disease and in crises of profound nervous exhaustion, they can be administered with advantage.

TONICS.

These are intended to sharpen the appetite, and increase the nervous vigor, and thus improve the health generally. They should not be given to already healthy animals, as they are not beneficial; nor should they be continued for too long a period, as they lose their effect. Small doses should be given at regular intervals, for one or two weeks, and then should be suspended for a few days, or another tonic substituted. They are either of animal, vegetable or mineral origin, as

Sulphate of iron. (Copperas.)
Sulphate of copper. (Blue vitriol.)
Arsenic.
Vegetable bitters. (Peruvian bark, gentian, quassia, etc.)
Alcohol.
Cod-liver oil.

As the mineral tonics are generally more active than those from the vegetable conditions, they are generally prescribed for horses and cattle; or the two forms are combined.

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☞ Drugs and medicines are not included in this Index, but should be looked for in the Alphabetical list on page 436; and Poisons in the list on page 428.

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